

PUNJAB INDUSTRIES

1911—1917.

Revised List of Agents for the sale of Punjab Government Publications.

IN THE UNITED KINGDOM.

CONSTABLE & Co., 10, Orange Street,
Leicester Square, London, W. C.

KEGAN PAUL, TRENCH, TRÜBNER &
Co., Limited, 68-74, Carter Lane,
E. C., and 25, Museum Street, Lon-
don, W. C.

BERNARD QUARITCH, 11, Grafton
Street, New Bond Street, London,
W.

T. FISHER UNWIN, Limited, No. 1,
Adelphi Terrace, London, W. C.

P. S. KING & SON, 2 & 4, Great
Smith Street, Westminster, London,
S. W.

H. S. KING & Co., 65, Cornhill, and 9,
Pall Mall, London.

GRINDLAY & Co., 54, Parliament Street,
London, S. W.

W. THACKER & Co., 2, Creed Lane,
London, E. C.

LUZAC & Co., 43, Great Russell Street,
London, W. C.

B. H. BLACKWELL, 50 and 51, Broad
Street, Oxford.

DEIGHTON BELL & Co., Limited, Cam-
bridge.

OLIVER & BOYD, Tweeddale Court,
Edinburgh.

E. PONSONBY, Limited, 116, Grafton
Street, Dublin.

WILLIAM WESLEY & SON, 28, Essex
Street, Strand, London.

ON THE CONTINENT.

ERNEST LEROUX, 28, Rue Bonaparte,
Paris, France.

MARTINUS NIJHOFF, The Hague, Hol-
land.

IN INDIA.

A. CHAND & Co., Imperial Book Depot
Office, Delhi.

GULAB SINGH & SONS, Mufid-i-'Am
Press, Lahore.

MANAGER, Punjab Law Book Depot,
Anarkali Bazar, Lahore

RAMA KRISHNA & SONS, Book-sellers
and News Agents, Anarkali Street,
Lahore.

HONORARY SECRETARY, Punjab Reli-
gious Book Society, Anarkali,
Lahore.

N. B. MATHUR, Superintendent and
Proprietor, Nazir Kanun Hind Press,
Allahabad.

D. B. TARAPOREVALA, SONS & Co.,
Bombay.

THACKER SPINK & Co., Calcutta and
Simla.

NEWMAN & Co., Calcutta.

R. CAMBRAY & Co., Calcutta.

THACKER & Co., Bombay.

HIGGINBOTHAMS, Limited, Madras.

T. FISHER UNWIN, Calcutta.

V. KALYANARAM IYER & Co., 189
Esplanade Row, Madras.

G. A. NATESAN & Co., Madras.

SUPERINTENDENT, AMERICAN BAPTIST
MISSION PRESS, RANGOON.

PUNJAB INDUSTRIES,

1911—1917.

BY

A. C. BADENOCH, I.C.S.,
Assistant Commissioner.



Lahore:

PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRINTING, PUNJAB.
1917.

Price : Re. 1.⁴⁻⁰~~5-0~~

PREFACE.

THIS little work, which is intended to bring Latifi's "Industrial Punjab" of 1911 up-to-date, and which should be read with that book, has been practically entirely written by Mr. Badenoch, Assistant Commissioner, under the general supervision of Mr. Maynard, Financial Commissioner, and Chairman of the Provincial Committee on Industries, and myself. Whatever merits are in it are entirely due to Mr. Badenoch. The opinions expressed in it are his own ; but they are, in my opinion, generally sound.

It has been written, primarily, for the benefit of the Industrial Commission ; it is hoped, however, that the general public will also find something of interest in it.

C. A. H. TOWNSEND,

*Director of Agriculture
and Industries, Punjab.*

August 1917.

CONTENTS.

PARAS.

INTRODUCTORY—

Scope of note	...	...	...	...	...	1
Situation in 1911 and after	...	...	...	...	...	2 & 3
Punjab Industries Department	...	...	...	...	...	4
Conferences on Industry and Industrial Education	...	...	...	...	...	5
Industrial Schools	...	...	...	...	...	6
Technical Colleges	...	...	...	...	...	7
Commercial Education	...	...	...	...	...	8
Arrangement of notes	...	...	...	...	...	9

COTTON--THE HAND INDUSTRY—

General	...	...	...	...	...	10 & 11
Government Central Weavery	...	...	...	...	...	12
Sir L. Dane Weaving School	...	...	...	...	...	13
Co-Operative Societies	...	...	...	...	...	14
Results and difficulties	...	...	...	...	...	15

COTTON--THE POWER INDUSTRY—

• Cotton Ginning	...	...	...	...	...	16
Cotton Spinning and Weaving	...	...	...	...	...	17
Reasons for want of success	...	...	...	...	...	18
Government organization of cotton auctions	...	...	...	...	...	19

COTTON--MINOR INDUSTRIES—

Hosiery	...	...	...	...	...	20
Barri Weaving	...	...	...	...	...	21
Zensana Industrial School	...	...	...	...	...	22

SILK INDUSTRY—

Sericulture	...	...	...	...	...	23
Silk weaving	...	...	...	...	...	24

WOOL INDUSTRY

VEGETABLE FIBRES AND THEIR PRODUCTS—

Wood pulp	...	...	...	...	...	26
Cryptostegia Grandiflora	...	...	...	...	...	27

DYEING AND COTTON PRINTING—

Government Dyeing School	...	...	...	...	...	28
Cotton Printing	...	...	...	...	...	29

PARAS.

TANNING AND LEATHER WORK—

Tanneries	30
Government help	31—32
Leather work	33

CHEMICAL INDUSTRIES—

Acid manufacture	34
Saltpetre	35
Chemical manures	36
Cement	37
Alkali Factory Schemes	38

ESSENTIAL OILS, ETC.—

Government Resin Factory	39
---------------------------------	----

SUGAR INDUSTRY	40
-----------------------	----

WOOD INDUSTRIES—

General	41
Need for Wood Depôt	42
Matches	43

METAL INDUSTRIES—

General	44
Sewing Machine Factory	45
Foundries	46
Copper and Brass	47
School of Metal Work	48

TINSEL INDUSTRY... ..	49
-----------------------	----

POTTERY—

General	50
Eureka Porcelain Works	51
Art Pottery	52

GLASS INDUSTRY—

The Indigenous Industry	53
The Factory Industry	54

FUEL AND WATER POWER—

General	55
Wood	56
Coal	57—59
Oil	60
Water Power	61—64

DIFFICULTIES IN ACQUISITION OF LAND—

General	65
Laws and Customs	66—67

MONEY ADVANCES TO WORKMEN—

General	...	...	...	...	...	68
Present position and remedy	...	...	...	...	...	69
Simplified method of adjudication	...	...	...	...	...	70

OCTROI—

General	...	...	...	...	...	71
Octroi on raw materials for soap manufacture	...	...	...	...	...	72
Octroi on iron	...	...	...	...	...	73
Octroi on raw materials for glass manufacture	...	...	...	...	...	74
Other grievances	...	...	...	...	...	75

RAILWAY RATES—

Theory that indigenous manufactures are penalised	...	...	...	...	...	76
Concessions	...	...	...	...	...	77
Inequality of treatment	...	...	...	...	...	78
Suggestions	...	...	...	...	...	79

APPENDIX I

Proceedings of Industrial Conference, 1911	i
--	-----	-----	-----	---

APPENDIX II

Industrial Schools	xx
--------------------	-----	-----	-----	-----	----

APPENDIX III

Statement of Co-Operative Societies (Weavers)	xxii
---	-----	-----	-----	------

APPENDIX IV

Report on Industrial Education, 1911	xxiv
--------------------------------------	-----	-----	-----	------

INTRODUCTORY.

1. This note is intended merely to indicate the industrial position in the Punjab now in 1917 as compared with 1911,—the year of publication of Mr. Latifi's "Industrial Punjab,"—and to show what action has been taken by the Industries Department. It is too soon to undertake a thorough revision of the above-mentioned survey; the lustrum since 1911, including as it does the financial crisis of 1913, has been prolific in failure, but sterile in enterprise; thus a review of "Industrial Punjab" would ultimately reduce itself to the scoring out of certain paragraphs, and notes as to the dates when various companies went into liquidation: the more general causes at work in 1911 have not yet greatly modified the character of Punjab Industry.

Scope of
note.

2. "Industrial Punjab" was written while this Province was on the crest of a wave of industrial and financial hope. Swadeshi Banking had been amazingly successful in eliciting capital from private hoards. The inability of the banks to find adequate and ready made short term investments forced them to put their money into one new industrial company after another. Their enterprise in the development of the cotton industry was emulated by individuals and by Joint Stock Companies. Ginning factories, tanneries, etc., sprang up like mushrooms, and gave an illusory appearance of great prosperity,

Situation in
1911 and
later.

of a coming miniature industrial revolution. In 1913 the wave broke, when the Peoples' Bank and the Amritsar Bank suspended payment ; the flood overwhelmed nearly all the Swadeshi Banks, sound and unsound, and many industrial concerns.

3. As a separate report on Banking and Industrial Failures is being submitted to the Industries Commission, there is no need to enlarge on this topic. Suffice it to say that Punjab Industry of 1917 is that of 1911, modified by this crisis, and to a smaller extent by the war. .

Punjab Industries Department.

4. The Industries Department in the Punjab is as yet in its infancy. The Director of Industries is also the Director of Agriculture ; and in an agricultural province as the Punjab, naturally the latter branch engrosses most of the Director's time. A textile assistant, formerly a State technical scholar, assisted by a supervisor of the Central Weaving Institute, and a weaving master, a dyeing assistant, an embroidery mistress for the Zenana School, and subordinate instructors in hosiery, and weaving complete the staff.

Conferences on Industry and Industrial Education.
Appendix I.

5. In 1911 an Industrial Conference was held in Lahore. Its proceedings lasted over four days, and the results are embodied in the appendix to this note. The recommendations in Part III have to a large extent guided the Department of Industries, but it has not yet been found practicable to make use of the suggestions contained

in Part I. At that conference the question of Industrial education was felt to be a peculiarly thorny one, and therefore in the following year 1912 Government appointed a special committee to enquire into, and report on this subject. A report of this committee is attached. Certain divergent views were elicited in this committee; to secure a uniform policy in this most important branch of industrial development Government has appointed a permanent committee consisting of Director of Public Instruction (President), Director of Industries, Chief Engineer, P. W. D., Loco. Superintendent, North-Western Railway, Rai Bahadur Ganga Ram, C.I.E., and the Principal, Mayo School of Art. This committee is feeling its way, seriously hampered by the financial stringency created by the War.

Appendix IV.

6. Of late years there has been a large increase in the number of Industrial schools—all financed by District Boards, or by Municipalities. A list of them is attached. The only school entirely financed by Government is the Mayo School of Arts and Crafts, Lahore, an institution which yearly grows and includes new subjects such as lithography, book-binding, and cotton printing. Proposals for the establishment of two large and well-equipped industrial schools in other centres of the Province are now under consideration, and will probably be put into concrete form whenever finances allow.

Industrial
Schools.
Appendix II.

A proposal initiated by Mr. Carter Speers, Professor of Chemistry, Forman Christian College, for including technical chemistry among the subjects for the B. Sc. course of the Punjab University, and for teaching it in a new laboratory about to be erected in the College, has passed the Syndicate and is now in the stage of circulation for the opinion of Fellows of the University.

Technical Colleges.

7. The only two institutions which might be properly styled by the more dignified titles of Technical Colleges are "The Victoria Diamond Jubilee Hindu Technical Institute" and the "Rasul College of Engineering." The first named college is maintained from various grants-in-aid by Government, the Lahore Municipality, etc., by private subscriptions, and interest on investments. It is a pioneer college and has met with a pioneer's difficulties; though hampered by lack of funds it has had considerable success in the training of its students. It is at present engaged in special research in the possibility of the manufacture in India of various articles of which import is now hampered by war conditions. For this purpose Government has given it a special grant of Rs. 5,000. The College of Engineering at Rasul (the head-quarters of the Lower Jhelum Canal) is entirely a Government and a Departmental Institution, its aim being to train men of the overseer and sub-overseer class for Government service. The college was started on

the initiative of Sir Louis Dane, and the original intention was that it should include also a more general mechanical section, to include motor mechanics. The latter part of the scheme was abandoned, much to the sorrow of the European Superintendent of Workshops. Thus, the Rasul College being primarily a school of civil engineering, the larger part of the students' time is devoted to attending lectures; the practical portion of the course is meant merely to teach the students as overseers how to superintend workmen. There is no doubt however that the school is an unqualified success, and, run as it is somewhat on English Public School principles, it is developing a good type of Public Works Department official. The college is managed by the Chief Engineer and the Director of Public Instruction, and has for its Principal a specially qualified officer of the Public Works Department. There are possibilities of development in this college which will be increased by the construction of an hydro-electric station at the head-quarters of the Lower Jhelum Canal, when and if that contingency occurs.

8. Commercial education in the Punjab is at present almost non-existent. Except for a Commercial School in Amritsar, which gives a rudimentary education in certain commercial subjects, there is no Government aided institution which devotes itself entirely to the teaching of commercial subjects. The Y. M. C. A.

Commer
Educati

in Lahore conducts evening classes in short-hand, type-writing, book-keeping, arithmetic and mathematics. For these classes Government gives a grant proportioned to attendance, and also pays a portion of the salary of the Principal, Mr. Hume. Already Mr. Hume is finding that there is a demand for day classes and a more ambitious course in commercial subjects ; it is recognised that, while the same scale of commercial education as required in Bombay and Calcutta is not necessary in the Punjab, yet something more elaborate and advanced should be obtainable. There are other commercial colleges with much more ambitious claims—such as the Punjab College of Commerce, the George Commercial College, and the Pioneer Commercial College. These are all private and money-making concerns. The Punjab College of Commerce has a well-qualified Principal, and does go some distance on the road towards efficiency, but all such colleges are hampered by the conditions of their existence. They may and do at times degenerate to being mere swindles. They rely on advertisement to attract a clientèle, and manage to pick up the discontented failures from schools and colleges. At present those interested in Commercial Education ask for an examination, diploma, certificate to work for, and some system of Government registration and inspection which will have the effect of preventing the establishment of inefficient and fraudulent institutions. The

Clerical and Commercial Examination of the Punjab University does not provide the test required. The University authorities are considering the matter.

9. To come to industry more particularly, subjects will be considered in the order of the chapters of Mr. Latifi's book, and notes as brief as possible will show the present position, and particularly any Government action.

Arrangement
of notes.

SECTION I.

COTTON—THE HAND INDUSTRY.

10. The 1911 census figures for the total number of cotton spinners, weavers, etc., with their dependants, are 883,156, a reduction of 71,800 on the numbers of 1901. General.

The 1911 figures for the districts selected by Mr. Latifi are—

Sialkot ..	.. 62,918	Gurgaon ..	.. 16,146
Hoshiarpur ..	.. 66,140	Shahpur ..	.. 32,292
Jullundur ..	.. 47,149	Jhang ..	.. 31,655
Lahore ..	.. 36,032	Montgomery ..	.. 21,466
Amritsar ..	.. 39,332	Multan..	.. 38,533
Ludhiana ..	.. 18,926	Mianwali ..	.. 14,194

The districts to which canal irrigation has been extended have naturally enough increased their proportion of weavers. There is however a reduction in the grand total, and there will probably be a much greater reduction at the next census.

11. The position of the handloom weaver shows little improvement; his wages seldom average more than 7 annas per day, and are often very much less. His standard of education has not shown any great improvement, and he is still among the most illiterate, bigoted, stupid and unenterprising of all the Punjab artisans.

Efforts have been made by the Industries Department to improve the industry, and to enable the weaver to make a better stand against the power loom.

Government
Central Wea-
very.

12. In 1911 Government sanctioned as an experimental measure for two years the institution of a model weavery with a staff of one weaving assistant, one mechanic, and five weavers. The experiment had a further extension of one year, and in 1914 Government determined to continue the weaving institute for four years at any rate, and have sanctioned the employment of a supervisor, weaving master, dyeing assistant, an embroidery mistress, besides a miscellaneous staff whose total cost must not exceed Rs. 225 per mensem. The approximate total annual cost is Rs. 20,000. The first Textile Assistant, L. Sheo Pershad, a Government technical scholar, was a man of enterprise and ideas; his death in 1914 was a loss to the Department. The present Textile Assistant, L. Kashi Parshad, Thukral, was also a Government technical scholar. The Central Weavery undertakes the following branches of work—

- (1) Experiment with and instructions on improved hand looms; experiments in beaming, sizing, etc.
- (2) Experiment and instruction in dyeing.

- (3) Instruction in use of knitting machines.
- (4) Manufacture of the handloom and its accessories, and sale of looms on the hire purchase system.
- (5) Travelling exhibitions.
- (6) Zenana embroidery school.

The real work of the model weavery is experimental and the intention is to popularise the results of such experiments, and of experiments made elsewhere, by travelling exhibitions. During the exhibitions competitions are encouraged, rewards offered, and orders registered for the manufacture of improved looms. In this way some 70 or 80 looms have been supplied. Purchasers of new looms are assisted to overcome the difficulties incidental to starting on a new machine, and are sometimes brought to the model weavery for instruction. 50 or 60 weavers have been trained either to work for themselves or to be instructors in other teaching institutions.

13. The model weavery works in combination with the Salvation Army Weaving School in Ludhiana. Help as described by Mr. Latifi on page 17 was given to the latter institution. A grant of Rs. 3,600 per mensem for 3 years was made in addition. District Boards were invited to give scholarships to young weavers for training in Ludhiana. While all due praise must be accorded to the Salvation Army masters for

"Sir Louis
Dane Weav-
ing School,
Ludhiana."

their pioneer work, it must be admitted that they have absolutely failed to get into touch with the Punjabi weaver. They have not consistently applied themselves to his problems; though situated in Ludhiana they have not systematically experimented on improved looms, with the finer counts the Ludhiana weaver uses, and hence there is an absolute lack of combination between the two. Again, the instructors have been induced to exploit their own loom to the exclusion of other, and, it is thought, more suitable, improved looms. Thus dissatisfaction with the results obtained led Government in 1915, while continuing the free grant of the fort, to withdraw financial assistance from the Salvation Army School.

Co-operative
societies.

14. By indirect methods too the Government is trying to ameliorate the lot of the weaver. There are now 12 weavers' co-operative societies, of which the largest, such as Ludhiana and Sialkot, include sales agencies as well as yarn distribution. The attached statement shows the progress made, and the success of the movement is now assured. The societies were formerly under the control of the Director of Industries, but have been transferred to that of the Registrar of Co-operative Societies. A central emporium or agency has been started to correlate the efforts, to distribute work and buy yarn in large quantities, and it is hoped that the scope of this central society will be extended.

Appendix III.

15. At the first glance the effects of all the efforts and money expended seem to be meagre, but one must remember that in this one cannot hope for a revolution in a day. Many problems have yet to be solved, and it has often been felt that the efforts of the Textile Assistant and his staff are apt to be wasted when there are no local agencies to support them. A travelling exhibition can remain in one place only for a few weeks. A weaver who has purchased an improved machine finds that he cannot at once turn out as much as on his old loom ; he has not the patience to persevere for a few weeks, and, seeing his daily earnings dwindling, he throws aside the new loom and returns to the old. The middlemen who hold all the profits of the industry are not farsighted enough to encourage the use of improved slays by paying some fixed wage while the client weaver is learning, failing to see the profit which will accrue both to himself and to the industry. Instead of undertaking the more difficult types of work, as a general rule the weaver prefers the cheaper and simpler, in which he must be beaten by the power loom. It has been a matter of particular regret that few small capitalists have availed themselves of the opportunities for study with the ultimate intention of starting small factories with good looms. The department thus has to face very great difficulties in this branch of work, and the apparent poverty of the result is not a reason for despondency.

Results and
difficulties.

SECTION II.

COTTON—THE POWER INDUSTRY.

Cotton-ginning.

16. The cotton power industry more than any other suffered from the crisis of 1913 : to a certain extent it created the crisis. Most of the banks had invested the bulk of their funds in this industry. The initial profits attracted a large number of competitors. Finally, so many gins were set up that the total crop of the province could hardly keep the gins working for two months. The total number of ginning factories (under the Factory Act) is now 157, and there are many smaller concerns with half a dozen to dozen gins which do not come under the Act.

17. No better is the state of the cotton mill industry. At present there are the following mills in the province (Delhi province is excluded) :—

Cotton spinning and weaving.

No.	Name.	No. of looms.	No. of spindles.
1	The Lahore Spinning and Weaving Mills, Shahdara	484	22,828
2	Mela Ram Cotton Mills, Lahore ..	..	13,248
3	The Amritsar Cotton Mills Co., Ltd., Amritsar .. ..	..	18,152
4	The Bhiwani Cotton Spinning and Weaving Co., Ltd. ...	287	12,728

The All-India Spinning and Weaving Mills Co., Ltd., was wound-up before it started operations. The Mela Ram Mills have not worked for several years. The Amritsar Cotton Mills have closed down lately. The Lahore Spinning and Weaving Mills are still struggling for life, but it is very doubtful if they do more than pay their expenses. The Bhiwani Spinning and Weaving Co. is the only one which gives signs of real vitality.

18. This is hardly perhaps the place fully to examine the causes which have operated against the success of these ventures. The dearness of their borrowed capital has certainly played a large share in hampering their development. The managers themselves however attribute a considerable proportion of their misfortune to the lack of skilled labour, and the necessity for a large outlay on it, an outlay which in most cases brings no return. The management of the Lahore spinning and weaving mills imports its labour from Cawnpore at considerable expense, and is often deserted by its operatives before any proportion of the preliminary expenses is paid off. Not only so, but this supply is numerically insufficient and of a poor quality. The better operatives never leave Cawnpore. At present the Lahore Mills have barely 18,000 spindles and 100 looms working, and it is declared that could labour be found for the whole there would be no question of success and failure. Con-

Reasons for
want of
success.

siderable difficulty is also caused by the dryness of the atmosphere in the Punjab.

Government
Organisation
of cotton
auctions.

19. No direct help of any sort has been given by Government to this industry, but one of the chief efforts of the Agricultural Department is towards the improvement of the staple of cotton, and the standardising of the types. The mixing of long and short staple cotton in the ginneries is a difficulty for which remedies are now being considered. Government management of the various cotton auctions is a measure more calculated to help the grower than the manufacturer, but nevertheless it is attended by all the advantages which an improved system of marketing can give.

SECTION III.

COTTON—MINOR INDUSTRIES.

20. The hosiery industry has made progress in the Punjab since 1911,—particularly in Lahore and Ludhiana. The supply of needles, however, necessary for this industry, is at present very scanty on account of the war, and this is impeding it. The Central Weaving Institute provides instruction in the use of knitting machines intended for small capitalists who wish to open small factories on their own account.

Hosiery.

21. The present position of the darri industry calls for little remark. While there has been an increase in the number of darries woven on the “desi khaddi,” there has been a corresponding decrease in the number worked on the frames with the “panja.” The colours and patterns of the Jail darries and those of the Muir Mills and Elgin Mills are attractive, and account to a large extent for the indigenous industry’s decline in the better grades.

Darri weaving.

22. It might not be out of place here to note the work of the Zenana Branch of the Central Weaving Institute. In this attempts are made to teach women, particularly widows, to earn something for themselves, and courses in embroidery (hand and machine), hosiery (machine),

Zenana Industrial School.

thread ball winding and winding of yarn on pirns and bobbins are given. There are at present 23 students on the rolls. The work of the school has been supplemented by philanthropic enterprize in provision of an institute to help the women after they leave the school. This institute in Lahore City markets the goods made by such women and provides them with work either to be undertaken in the institute or at home.

SECTION IV.

SILK INDUSTRY.

23. While silk weaving has remained un- Sericulture.
 progressive in the Punjab, sericulture has made a
 certain advance. The initial experiments (In-
 dustrial Punjab, page 37, note) had sufficient
 success to attract the attention of two gentlemen
 who may be considered the pioneers of sericulture
 in this province—Khan Bahadur Sh. Ghulam
 Sadiq and Commissioner Booth Tucker. The
 former has made great efforts to start the indus-
 try on the Kashmir system, in Gurdaspur Dis-
 trict particularly, and has distributed a gradual-
 ly increasing quantity of seed. In 1914, the most
 successful year, 539 ounces of seed were reared,
 374 oz. by Khan Bahadur Sh. Ghulam Sadiq's
 rearers. On the suggestion of Commissioner
 Booth Tucker a certain amount of seed was dis-
 tributed to primary schools which had mulberry
 trees in the vicinity in submontane districts.
 Leaflets and attractive object-lesson cards have
 been distributed. After many experiments of
 varying success the Salvation Army started the
 rearing of cocoons on a large scale at Changa
 Manga, and on a smaller scale at Lahore, Chaua
 Pail and Ludhiana. Unfortunately the charac-
 ter of the winter rains was such as to cause de-
 terioration in supply of mulberry leaves, and the

average yield per ounce of seed has been disappointing. The Salvation Army are discontinuing sericulture on the very large scale it practised in 1916 at Changa Manga. A Salvation Army school of sericulture has been started at Simla and has been given a grant of Rs. 2,000 per annum by the Punjab Government on certain conditions. Other measures of help have been adopted. The annual exhibition of cocoons has had a marked success in stimulating interest. District and Canal Officers in submontane districts have paid special attention to the planting of mulberry trees. The Assistant Professor of Entomology in Lyallpur has charge of this branch, and the Secretary of State has just sanctioned the employment of an especially trained entomologist, one of whose duties will be the study and encouragement of sericulture.

Silk weaving.

24. Most of the "daryai" weavers have turned their attention from pure silk to artificial silk, and it is seldom one finds a good silk daryai, on the loom. The artificial silk daryai, with a warp of mercerised cotton and a weft of lustre, has a crude colouring, attractive to the oriental taste, and is about one-third of the price. Such deterioration in the class of work cannot but mean that the industry will soon disappear, as the hand loom cannot compete with the power loom in the cheaper fabrics.

SECTION V.

Wool.

25. Punjab wool is primarily a care of the Veterinary Department which for some years has been trying to improve its quality. Large numbers of Merino Rams from Australia have been imported, and distributed in districts, or used for breeding purposes in Hissar Cattle Farm. There are now in Kangra many half bred or $\frac{3}{4}$ bred Merino sheep and rams, and in 1915-16 no less than 65 rams $\frac{1}{2}$ or $\frac{3}{4}$ bred were supplied to private individuals and District Boards by Hissar Farm. The cross gives a very good wool which has fetched better prices in Cawnpore, Dhariwal and Bradford than can be commanded by the ordinary quality; and hence it is expected that should these rates be readily obtainable by Indian sheep owners there will be a large increase in the demand for the merino cross. The New Egerton Woollen Mills of Dhariwal is the premier industrial concern of the Punjab. It cannot however be said to have a primrose path of development, and it displays, as is nowhere else in the Punjab displayed, the difficulties which industrial enterprise has to face. The impediments to the acquisition of land will be discussed later. Expectations of the benefits of water power have not been fulfilled. Such a textile industry must have a certain amount of coal to

carry through its processes of dyeing and finishing. The rotational working of the canal necessitates the use of a steam plant for a considerable portion of the working year, and when to the total coal bill is added the Irrigation Department's charge for the use of water, the power expenditure is one third greater than that at the Cawnpore Woollen Mills, and the outturn only two-thirds of the total output of the latter concern. Not only so, but labour is an increasingly difficult problem at present. There is a proposal, eagerly accepted by the Manager of the Woollen Mills, to locate a settlement for members of criminal tribes near Dhariwal, with the object of inducing them to take to permanent employment in the factory. Before the outbreak of war the New Egerton Mills were very large manufacturers of "lois," and were to a certain extent supplanting the indigenous manufacturers of those goods. Indeed, the manufacture of "garbi lois" has almost died out; in Sialkot only about 6 looms work instead of the 100 of 6 years ago. The shawl, blanket and loi industry of Jalalpur Jattan in Gujrat District has suffered very seriously from the war, since for the bulk of its outturn it depended on imported yarn. Neither Dhariwal, nor Cawnpore, busy as they are on Army contracts, can supply the required yarn at present. On the other hand the war has been a blessing to the weaver of pashmina shawls and cloth, as it has entirely stopped

the import of the shoddy German article, and very largely impeded the manufacture of the adulterated Indian one. The Ludhiana Pashmina weaver is strongly in favour of an arrangement whereby he can get a certificate of quality, and is willing to pay for it. The indigenous blanket industry suffers from the same defects as the hand loom cotton weaving, but has not yet been brought quite so low. There is always a big demand for cheap horse blankets, &c., which can be admirably met by the village blanket weaver. At present Panipat and its surrounding villages are supplying to contractors some 200 blankets per day. There is room here for organisation and co-operative methods and the introduction of improved machines. Such would put the indigenous industry on as strong a basis as the hand weaving woollen industry of Ireland.

SECTION VI.

VEGETABLE FIBRES AND THEIR PRODUCTS.

Wood-pulp.

26. The question of the suitability of the Punjab for the manufacture of wood pulp has received not a little consideration from officials and private firms. The conclusions arrived at have been rather diverse. Members of private forest companies have expressed considerable dubiety as to the practicability of getting the suitable trees—spruce and silver pine—to the factory at a price which would make the manufacture of pulp pay. Investigations were made by Mr. William Raitt, once Cellulose Expert at the Forest Research Institute of Dehra Dun. Concessions in Kulu and Kangra have been given to an applicant, but as yet nothing has been accomplished, and the lease expires in the present year. Mr. Raitt is presently engaged on research into the possibility of the manufacture in Kashmir, and it will not perhaps be a matter for surprise if Kashmir shows again an example of enterprise to British Administration. Until wood pulp is manufactured in North India there is little chance that any paper mill will be established in the Punjab: paper-making at present is almost entirely a monopoly of the jails. The war has given a temporary fillip to the indigenous industry at Sialkot, but it cannot hope to survive for long.

27. *Cryptostegia Grandiflora* is referred to at page 81 of the "Industrial Punjab" as a plant yielding a good fibre, but it was as a rubber-yielding plant that it attracted considerable attention some 6 or 7 years ago. The rubber gave good results under analysis, and was considered as being able to fetch in London about two-thirds of the price of good Para rubber. A company was formed in Karnal to extract the rubber, machinery was bought, the creeper was planted on canal banks and roadsides. Unfortunately an unforeseen difficulty arose—the rolling process of extracting the rubber extracted as well as the sap, which by a chemical action entirely destroyed the former. Extraction by hand is an impossibility, and the difficulty has as yet proved insurmountable.

*Cryptostegia
Grandiflora.*

SECTION VII.

DYEING AND COTTON PRINTING.

Government
Dyeing
School.

28. It is somewhat strange that the complacency of the Indian dyer has not received greater shocks lately than has been the case. As yet few have realised that modern dyeing is an art with which they have little acquaintance. Even the carpet-weavers of Multan were perfectly satisfied with themselves, and were convinced that their crude and glowing assortments of colours were as artistic as the most beautiful of old Persian rugs. In connection with the Central Weaving Institute a Dyeing School has been formed, conducted by one of the Weaving Institute staff who passed out first of his year from the Dyeing School of Cawnpore, and generally supervised by the Dyeing Assistant, who received his training in England. At present the course is a six months' one, and is intended to inculcate an improved use of indigenous dyes and of the mordants suitable for various fabrics. It will work in close connection with weaving centres which are feeling severely the scarcity of dyeing materials.

Cotton Print-
g.

29. The death of the cotton printing industry of the Punjab must be attributed, not to cessation of demand, but to decay of the art. Efforts were made by a recent Deputy Commissioner of

Montgomery to help the only surviving Kamalia cotton printer. The Principal of the Mayo School of Art has started a class for this craft, and there are now six pupils studying Farrukhabad colouring and design. This is a cottage industry, which, if the standard of art is maintained, should suffer little from the competition of machinery. Efforts to put the cotton printer into touch with the market would probably have a stimulating effect on the industry.

SECTION VIII.

TANNING AND LEATHER WORK.

Tanneries.

30. Despite the existence of many facilities, *e.g.*, hides, tanning materials, and despite the example of a large and successful tanning concern in Cawnpore, the history of the Punjab enterprise in this direction for the last half dozen years is more or less a record of failure. Of the firms noted by Mr. Latifi, the Rawalpindi tannery failed by reason of lack of practical expert knowledge, and of dissensions between partners ; the opposition of local workman brought the Julundur enterprise down, while the tannery at Ferozepore was never really in working order. At present only the Wazirabad and Shahdara Tanneries are going concerns. The former turns out about 70, the latter 50 skins per day, of which approximately one-third in each case are tanned and finished by so-called English processes. Neither firm has any difficulty in disposing of its goods, despite the fact that neither does any real advertising ; with a little effort the market could be increased. They both lack expert supervision, although the managers have a certain practical knowledge of old-fashioned processes ; neither concern can hope permanently to hold its own without extension of its activities, modernising of its processes, and improvement in its business practices.

81. An effort was made in 1912 to help the industry by the grant on very favourable terms of a disused Government building in Amritsar, to a State scholar, Khatik by caste, who had returned from England and America with an exceptionally a good record. This man was to turn out leather tanned by English processes, and also to teach apprentices. The scheme was a failure from the outset—the young men had neither sufficient practical knowledge of the processes, nor sufficient ordinary business aptitude to conduct the operations of a factory. His lack of capital forced him to form partnerships with men who knew nothing of his trade, and quarrels and mutual suspicions forced the partnership into dissolution within a very short time. Government failed to recover even the trifling amount of rent demanded.

Government
help.

82. Some efforts have been made by the department to improve the quality of skins, by inculcating care in flaying, and also to investigate supplies of tanning materials, but no great result could be expected where no expert staff existed.

83. The standard of leather work shows considerable improvement. The mochi is quick to learn, and, could he but tame the quarrelsomeness of his character, the success of the co-operative movement, newly applied to this class, would be assured. As it is there are two co-

Leather
work.

operative societies of Chamars which always give their inspectors considerable annoyance. In places such as Karnal, where the mochi is as clever as, but less dishonest, quarrelsome and greedy than in other places, his business is flourishing. In Karnal, Government contractors are supplied by the mochis, and every article manufactured is sold at excellent prices.

SECTION IX.

CHEMICAL INDUSTRIES.

34. The six years which have elapsed since the publication of "Industrial Punjab" have not brought to notice workable supplies in the Punjab of any basis for sulphuric acid. Nevertheless there are in all now four small factories which produce sulphuric acid. The two Lahore factories are mentioned by Mr. Latifi. Their processes are of the crudest order, and they have failed to engage any expert help; their supply is insignificant for commercial purposes. Messrs. Shambhu Nath and Sons of Amritsar raise sulphuric acid to higher strength, and utilise it in the manufacture of other acids and chemicals. The proprietor of the factory is a man of great enterprise and ingenuity, and the Department is doing what it can to help him. The Punjab Chemical Works at Shahdara opened only a few months ago, and will supply various acids and chemicals besides chemical manures.

Acid manufacture.

35. During the spring of 1915 measures were taken by the Director of Industries in conjunction with the Commissioner, Northern India Salt Revenue, to increase the output of potassium nitrate. Along with the reduction of license fees and the opening of closed areas, the co-operation of district authorities was obtained in inducing villagers to sell the saline earth on easier terms; cheap wood and cheap water were obtain-

Saltpetre.

ed for the refiners from the Forest and Irrigation Departments respectively. The figures for the production of the last three years are as follows, in maunds :—

<i>Year.</i>		<i>Crude saltpetre.</i>	<i>Refined saltpetre.</i>
1913-14	.. ..	267,175	87,010
1914-15	.. ..	345,001	106,176
1915-16	.. ..	475,777	152,301

Each refinery works a group of leases and may hold from 20 to 200. The refinery finances the “lunias” who exploit the nitrous earth, and deliver it to the refinery. Thus it is important for the refinery to have an adequate number of leases in hand. The rise in prices has not only attracted capital to the establishment of new refineries (some 5 or 6 new factories have been opened lately), but has stimulated very keen competition for leases. This competition usually has a dishonest character, one refiner intriguing with a zamindar for a lease at present held by another refiner. The rises in prices of leases have often been twenty-fold. The result is that the industry is over-capitalised, and a fall in price will probably mean the ruin of many. Further, Government by surrendering rights over saltpetre in most instances has lost a good source of income, and control of a raw product of national importance. Refiners who run their business on safe principles would gladly see Government assume control of the industry, charging royalty which would be shared between Government and the zamindar owning the nitrous earth.

36. Investigation was made into the possibility of the manufacture of chemical manures from the phosphate nodules and from the gypsum of the Salt Range. The fact that the former mineral was not found in commercially workable quantities, and that the latter was suitable for only certain types of soil, accounts for the absence of result from either experiment.

Chemical
manures.

37. Dandot offers almost unrivalled advantages for the manufacture of Portland Cement. Lime, gypsum clay and coal are all found on the spot: the first two at any rate in unlimited quantities. A syndicate was given in 1913 concessions to exploit the minerals, and Government entered into a ten years' contract for the purchase of cement. The arrangement was opposed by Indian interests and also financial authorities in England on grounds of principle, and the refusal by Government to sanction transfer of concessions resulted in their lapse.

Cement.

38. The biggest chemical project which has yet been considered was that of the construction of a caustic soda factory at either Rasul or Khewra. While the Director of Industries was examining this scheme the Canal Department were considering the possibility of the erecting of a hydro-electric station at Rasul. Detailed investigations in both directions were made, and the results are on record, but both are schemes which still await development.

Alkali fac-
tory scheme.

SECTION X.

ESSENTIAL OILS, ETC.

Government
resin fac-
tory.

39. The experiments of the Punjab Forest Department in the manufacture of turpentine oil and colophony have resulted in the establishment of the Demonstration Factory at Jallo : 10 miles from Lahore. There can be little doubt as to the success of this venture ; the factory has been in working order for little over two years, and already the original cost of the plant (about Rs. 90,000) has been wiped off, and a substantial profit made. The normal outturn is about 5 tons of resin and 300 gallons of oil per day, both products being of extremely good quality, though perhaps not chemically as pure as the imported American articles. The factory runs on a selling agreement with the Bhowali distillery in United Provinces ; there seems to be little doubt that could an organised attack be made on outside markets, there would be nothing to fear from American competition in Australia, South Africa, etc. The factory is not yet turning out its maximum. There are of course special reasons why such a factory should prosper particularly well under Government management. Proper organisation of the tapping operations, of the collection of the resin, and its transport at the proper time to the factory can be better

done when the whole is under one management, and, with the sources of supply of the raw material almost entirely in Government hands, it would seem doubtful policy ever to hand this activity over to private enterprise.

SECTION XI.

THE SUGAR INDUSTRY.

40. Conditions do not as yet make for the localisation of the sugar industry in the Punjab. The deficiency in the yield of gur from the canes generally grown in the province, and the poverty of the sucrose content of that yield,—due to the cold of the Punjab winter—constitute the biggest obstacles to progress. The Government Experimental Farm at Gurdaspur devotes special attention to cane. The results of the experiments show that the future is not hopeless. A proposal to start a small cane farm in the south-east of the Province, where the climatic conditions are more suitable to cane than are those of Gurdaspur, is under consideration.

Of the factories mentioned by Mr. Latifi only two are now in existence. The Sujampur factory has continued its successful career, but its profits are not entirely due to sugar refining ; country spirit is also manufactured, and a big trade is done in carbonic acid gas, the bye-product of the above. The factory is, however, the only considerable one in Punjab where the process of sugar refining is carried from the cane to the finished product, and credit is due to the management in that, despite difficulties, the concern has paid its way. The Harkishan Sugar Mills in Amritsar,

on the other hand, merely extract sugar from gur imported from United Provinces, local gur giving bad results. Its production is 80 to 85 maunds of sugar per day of 24 hours. Before the war the factory was closed down, but the rise in the price of sugar has given a temporary impetus to the manufacture which, it is feared, will be soon spent on return to normal conditions.

Both the bigger enterprises mentioned in "Industrial Punjab" have come to grief. The Punjab Sugar Manufacturing Company, Limited, never showed any signs of prosperity and is now being wound up. It is a matter for regret that the Amritsar Distillery experiment proved a failure. Mr. Latifi gives a brief description of the scheme. It met with no success whatsoever, and the following reasons have for its failure been put forward :—

(1) The "Hadi" or "open boiling" system was used and proved quite unsuitable to Punjab conditions. A considerable percentage of the material becomes caramelised. Sujapur and the Harkishan Mills both employ the vacuum pan system, that has been shown to be much superior.

(2) Great difficulty was experienced in getting cheap cane and in inducing cultivators to extend cultivation so as to cheapen the production. Zamindars refused to sell cane stripped and ready for rolling, and would dispose only of

standing crops which the factory had to guard, cut, and prepare.

(3) Initial operations were on too large a scale : about 4 lakhs were at once invested in the enterprise : had one branch factory been properly run, and operations gradually extended, the issue might have been different. There was a want of expert knowledge as well, and with the death of Mr. Dyer, the originator, the Amritsar Distillery sugar experiment came to an abrupt end.

SECTION XII.

WOOD INDUSTRIES.

41. As yet the Industrial schools have not had any real effect on the standard of Punjab carpentry. This is not a matter for surprise, as no one would claim that the Industrial schools at present in the Province are sufficiently equipped with apparatus or staff to achieve much in the higher branches of woodwork. The Mayo School of Art is accessible only to few, and the Principal cannot spare the time adequately to control the many institutions which profess to give instruction in carpentry and iron work. The wares of recognized Gujrat cabinet-makers have deteriorated in quality and increased in price : the brass and ivory inlay work of Jullundur and Hoshiarpur wastes itself on inelegant designs overburdened with detail. There is indeed urgent need of the contemplated school of carpentry which is to be started on the lines of the Bareilly school, so that the work of the Mayo School of Art may be supplemented. There is however no doubt that the city carpenter has adopted European tools, and in Lahore and Amritsar circular saws and other appliances driven by electrical power can be observed in the shops of cabinet-makers and coach-builders.

General.

Need for a
wood depôt.

42. A very general complaint, and one urged with great emphasis by the Principal of the Mayo School of Art, is that nowhere is it possible to buy wood of a guaranteed age. Standing trees, or scantlings are sold by the Irrigation and Forest Departments and by District Boards. The Indian carpenter has not however sufficient capital to allow of his keeping wood until it is thoroughly seasoned, perhaps after 30 years, nor has he the storage accommodation. It has therefore been suggested by Mr. Heath that there should be a central wood storage depôt managed by a combination of Government departments, where wood of known age can be obtained. Until such can be established there is a probability that good workmanship will be wasted on improperly seasoned wood.

Matches.

43. The Punjab is responsible for a single experiment in match manufacture. A retired clerk, by name Raghu Ram, set up a small plant at Solon. A verbal arrangement with a Bhagat State official regarding supplies of timber came to naught, and thus the factory was soon immobilised. It did however have time to experiment with Chil wood (recommended in Troup's monograph). A few gross of boxes were placed on the Simla market, but utterly without success. The fibres of the wood were too twisted, and the splints therefore much too brittle; the proprietor of the factory who has stu-

died Japanese match making in Japan is convinced that Chil wood is absolutely unsuitable, but that spruce, silver fir, and blue pine—all common trees in the Punjab hills—are good match woods. The great difficulty with regard to spruce and silver is their lack of buoyancy and the impossibility of floating them to places such as Beas or Jagadhri, which otherwise seem to be properly located for the establishment of such an industry. The question is very largely one of forest concessions and hill transport.

SECTION XIII.

METAL INDUSTRIES.

General.

44. There has been in the iron and steel industry a distinct tendency towards factory development; machinery is as yet only sparingly employed, and nearly all processes are carried through by hand, but the advantages of division of labour are recognized and utilized to perfect workmanship and to introduce economics. Of these factories the oldest and largest is that of Rai Bahadur Buta Singh, C.I.E., of Rawalpindi, which shows a high degree of organising talent, and which is at present turning out nearly 3 lakhs worth of miscellaneous goods per month. Nearly all for the army. Machine processes are few, the proprietor declaring that it is not worth his while to install machinery unless he is certain of the continuance of Government patronage. It is chiefly lack of capital which prevents small cutlery factories at Wazirabad (Krishna Cutlery Works) and at Nizamabad (Alla Ditta) from installing machinery: their work is good, though somewhat expensive. In Sialkot a Muhammadan has collected many of the lock-makers into a small factory, where a good quality of lever locks, though heavy, are made by hand. In Jullundur efficiency has been given to the iron work industry by the enterprise of two Khatris (Khem Chand

and Bhola Nath) in collecting the smiths into one place and organizing the work by division of labour.

45. Perhaps one of the best exhibitions of enterprise has been given by a Hindu of Ludhiana—Ganda Mal Bahri. This gentleman was an agent for the German Durkopp sewing machine; he is in addition director and part proprietor of a cotton-ginning factory in Ludhiana. On the outbreak of war, and on the consequent loss of his agency for Durkopp machines, he himself experimented in their manufacture, with the result that in the face of many difficulties in obtaining machinery, he has put on the market a good sewing machine selling at a moderate price. He knows the virtues of agency and advertisement, and will find a good market: he has utilized the power of his ginning factory, finding a partial solution of the question "What to do with a ginning factory that need not have been built"?

Sewing machine factory.

46. Foundry work is undertaken by only a very few firms. Hari Ram and Sons in Rawalpindi eke out a precarious existence by ministering to various army needs. A former engineer of a rice mill now himself manufactures rice husking machinery in Multan, and a small foundry does miscellaneous work in Lahore.

Foundries.

47. Nowhere has there been any change in the traditional methods of manufacture of brass

Copper and brass.

and copper vessels. This industry indeed suffers very severely from war conditions, and competitions among the workers for work has considerably reduced earnings, despite a rise in price of the finished articles.

School of
metal work.

48. The province does not yet possess a Government school of mechanics, engineering foundry work, etc., but it is a want which will probably be supplied when finances allow; the ambitious Lohars of Kotli Loharan would welcome such a school in Sialkot.

SECTION XIV.

TINSEL.

49. There is at present a temporary revival of the gold and silver tinsel industry, due in the main to war conditions. In Amritsar labour saving appliances of various types have been adopted with benefit to the workers, but in other places the old methods prevail, and, since the different processes are in different hands, lack of combination among workers has forced the average earnings down to a minimum. It is doubtful, however, if the cottage-made tinsel can ever again really hold the market. The gold and silver thread made in the Punjab is of so uneven a quality that it is seldom used in weaving, seldom used in fact for anything else than for embroidery for shoes. It will always be undersold by European tinsel in which the proportion of gold is very much less. There is, however, among the wealthy a certain demand for the more expensive heavier gold and silver thread of India, and some disappointment has been felt that the Government of India has given its verdict against a system of hall-marking which would do something to protect the trade.

SECTION XV.

POTTERY.

General.

50. In this industry the traditional methods still hold their place, and the position is as it was in 1911. In the progressive agricultural tracts the use of metal for the Persian wheel well apparatus is slowly driving out the work of the village carpenter and potter, and to some extent the village potter is losing his custom. The glazed pottery of Gujranwala, Sialkot and Rawalpindi, the Kagazi pottery of Basti Sheikh and Panipat are still well known, while the rise in the price of copper and brass have given the ordinary potter an opportunity that he has to some extent taken advantage of.

Eureka Porcelaine works

51. In this branch of industry the only concern which has adopted modern methods is the Eureka Porcelain Works, Limited, Lahore. The success of this enterprise is almost entirely due to the initiative of the Managing Agent, Dogar Singh. The factory turns out tiles for building purposes, of a very good quality, and has more orders than it can overtake; it is however hampered at every turn by want of capital. This business has a magnificent opportunity; it only remains for its directorate, and other capitalists, to realise the fact. Here, too, is afforded one

of the few instances in this province of an alliance between industry and science as represented by the colleges, for the problems and experiments of the Eureka Procelain Works are studied—by the permission of the Professor of Chemistry—in the laboratory of the Forman Christian College. This is the beginning of an arrangement, on American models, which is designed to bring industry into closer connection with the scientific research of the colleges, an arrangement initiated by Mr. Carter Speers, Professor of Chemistry at the Forman Christian College.

52. The Art Pottery of the Punjab as represented by Multan work has suffered a continuous deterioration. Samples have been sent to England and expert advice has been taken; but there is little hope that any real improvement can be accomplished until an expert is brought into contact with the potters. This consideration has weighed so far with the Principal of the Mayo School of Art, that, in his programme of extensions for the school, the addition of an art pottery branch takes first place. For the present, however, the potters are being urged to experiment on the lines suggested by the English expert.

Art pottery.

SECTION XVI.

THE GLASS INDUSTRY.

The Indigen-
ous glass
industry.

53. The indigenous glass industry has suffered a still further decline since 1911: here and there furnaces have ceased to work, and families have abandoned the trade. Practically all the crude glass for the manufacture of bangles comes from Ferozabad in the United Provinces, and, with the exception of Panipat where two small factories still turn out the "kumkuma kanch," the indigenous workers content themselves with bangle-making. This is a craft which is probably better as a cottage industry, nevertheless Punjab methods are so bad, and the quality of articles produced is so poor, that there is danger of the absolute disappearance of this form of activity. The price is very much below that of the imported article, especially in Karnal and the neighbouring districts, but in this matter, for once, the better article is preferred by the Indian consumer to the cheaper. Improvement not only in the method of work, but also in the design of furnace seems to be necessary; there seems to be no reason why crude "kanch" for bangle-making should not be made in this province: but both of these are matters for expert treatment.

54. Of the modern factories existing in 1911, one, the Panipat Glass Works, failed three years ago owing to want of expert knowledge. The Upper India Glass Works has passed through vicissitudes of fortune. Formerly this factory held the Indian market for crude kanch used in bangle-making, but the proprietor, with more ambitious ideas of development, employed an Austrian furnaceman and an Austrian blower. As noted on page 288 of "Industrial Punjab," an agreement was drawn up with Government whereby, in return for monetary help, the proprietor agreed to train at one time ten apprentices, of both educated and uneducated classes. The intention of the scheme was to improve the indigenous industry, to train the Indian glass workers to blow glass in their own homes. The agreement was never signed: the Austrian employees of the Glass Factory raised difficulties, and the scheme had to be dropped. Thereafter the factory has been closed down more than once owing to the impossibility of obtaining the services of expert blowers. Finally Japanese blowers have been engaged, and a furnace on Japanese model erected: the new employees have worked well with the Indians, eighteen in number, whom they have trained. The factory has specialised in the manufacture of lamp chimneys to the exclusion of all other articles and finds that there is ample scope in one branch. The workmen have been given an

The Factory
industry.

interest in the factory's output by means of an interesting profit sharing system, and at present the concern is weekly increasing its activity. The Director of Industries sent up a proposal to subsidise the Ambala Glass Works, the manager maintaining that should the grant be one of Rs. 2,000 only, the result would be rise in prestige and greater ability to borrow capital. The Government of India however refused to sanction this proposal. The factory is at present doing well, and could sell at least thrice its present output of chimneys, was it able to produce them. Its success is largely due to the custom of the North-Western Railway, which has ceased to obtain lamp chimneys from abroad in consequence of the war.

SECTION XVII.

FUEL AND WATER-POWER.

55. Not many decades ago wood was almost General.
the only fuel used in the Punjab ; to-day the use of wood is confined to the small industries, such as brass utensils and glass bangle manufacture, saltpetre refining, etc. Coal is almost universally used in factories of any size, but the oil engine is acquiring a steadily increasing popularity throughout the province.

56. Only a Forest Officer can speak with Wood.
authority on the available supplies of cheap wood fuel, but with the cultivated area extending, as is the case, it is exceedingly doubtful whether industries in this province can hope for much in the future from wood fuel.

57. In 1912, the Dandot coal mines were Coal.
sold by the North-Western Railway to the two firms of Thakar Das Ramji Das, and Ishar Das. The bulk of the outturn of what was the Dandot Colliery is mined by the first firm, and amounts to some 23,000 to 25,000 tons per annum. About 7,000 to 9,000 tons are produced by the Dandot and Pidh mines in the possession of Ishar Das. Dandot coal is very difficult to work ; the seams are only 6 to 39 inches thick, and are mixed with pyrites and other impurities. The strata im-

mediately above, being shale and clay, require careful buttressing, and, the outcrop coal having been removed by the North-Western Railway, work at the face is carried on under increasingly difficult conditions. The coal is extremely friable and even at the pit head is largely dust. The quality of the labour to work the mines is bad, and its quantity very uncertain.

58. Dandot coal is very bad steam coal, so much so that at Khewra, two miles away, where its price is Rs. 8 as compared with Bengal Rs. 17, it has been entirely abandoned in favour of the latter, which is said to give three times as much work. It is however supplied to the Lahore Electric Supply Company, the only considerable plant using it. Practically the whole Dandot output is now devoted to brick burning, and hence when, during the rainy season, no bricks are manufactured, there is no demand for Dandot coal. There is therefore a very marked slack season, during which however the mines must be kept open, and labour paid. It is not therefore, on the whole, surprising that the outturn per man per year is only one-third of the amount similarly calculated in Bengal. The proprietors are considering the possibility of improving on the present state of affairs by using electric coal cutters, power being available on the spot. Such an installation would introduce many economies and would probably pay,

but the demand for Dandot coal is unlikely ever to increase at the expense of Bengal coal until some boiler and furnace be discovered specially adapted to its idiosyncrasies.

59. A certain amount of coal of the same quality as Dandot coal is produced in Shahpur District, but the lessees of the Makarwal concession in Mianwali District claim that they can supply a very much superior article. The coal here is stated to be easy to work and of good quality. Only the construction of a railway siding is necessary to secure the development of this concession: in fact without the siding the concession is unworkable. Should such coal prove to be even a moderately good steam coal the benefit to the Punjab will be enormous.

60. There have been many prospectors for mineral oil in the Mianwali, Attock, Rawalpindi and Jhelum Districts, but no definite results were obtained until Steel Bros., a company with experience of Burman Oil fields, took over the managing agency of the Attock Oil Company. Experimental borings have shown that this company has struck an oil field, the extent of which still remains uncertain. Two wells have given good results but further successes must be obtained before this discovery can be hailed as a great one. In any case the large quantity of water will always cause considerable anxiety and necessitate great care in boring.

A mining lease for 30 years over the Khaur area has been sanctioned by Government, and the firm only awaits a more accurate estimate of outturn before deciding the question of the location of the refinery. At present its main difficulties are due to absence of metalled roads, and the troubles of land acquisition. Complaints have been made that the prospecting rules may force the firm to give up licenses which they cannot, owing to War conditions, work at present, but may work in future.

Water-power.

61. It has always been recognized that the presence of water power in the Punjab should be an enormous industrial asset, and Sir Lewis Tupper (Financial Commissioner) in 1904, and Sir Louis Dane (Lieutenant-Governor) in 1909 directed special investigations into the subject. In 1904 three definite hydro-electric schemes—two for utilizing the waters of the Ravi near Madhopur, and one contemplating the erection of a hydro-electric plant somewhere near the headworks of the Western Jumna Canal—were framed. In 1909 Mr. Ashford worked out a hydro-electric scheme for Rasul, the head works of the Lower Jhelum Canal: the project depending on the construction of a cross cut between the Upper and Lower Jhelum Canals which would give a drop of 24 to 30 feet. This power was then intended to work the Dandot and Khewra mines, and possibly a hydrolytic plant for the

manufacture of caustic soda either at Khewra or at Rasul. In every case very great doubt was expressed by the framer of the scheme that the power generated would find a sufficient market, for in each case it was to be enormous. Moreover it was more or less expressly stated that a rotational system of working the canals would be fatal to any hydro-electric scheme.

62. The first actual attempt to utilise water power for industrial purposes was made by the New Egerton Mills, Dhariwal, and so far this is the only really large concern depending on water power. The power generated has varied from time to time, but recently the Mills acquired a lease of the whole water in the canal. According to the experience of this firm the results of the utilization of canal water power are disappointing. The New Egerton Mills are, perhaps, somewhat unfortunately located, for the canal at this point is subject to rotational working, and the employment of steam plant for at least 18 weeks in the year is a necessity. The rent paid for the water has risen from 5,000 per annum to the present figure of Rs. 24,000, the latter figure being however for all the water in the canal.

63. The idea of locating small hydro-electric stations on canal falls to work batteries of tube wells was first propounded by Mr. Ashford, Superintendent of the Central Workshops at

Amritsar, and has been put into practical shape under his own supervision at that place. The idea should be one fruitful of good, making possible the irrigation of land hitherto uncommanded by canals, or the removing of subsoil water, by tube wells, where it is too near the surface as in the neighbourhood of Amritsar. There are also considerable numbers of flour and rice mills which depend for their power on canal water.

64. The question of the charges for the use of water is a technical one, and one which the Industries Department has never discussed. It has however been generally urged by non-official opinion that in this matter a leniency might be shown which would cost Government nothing, and which might certainly benefit industry.

SECTION XVIII.

DIFFICULTIES IN ACQUISITION OF LAND.

64. Land laws and customs affecting land have in the agricultural Punjab a form which makes the acquisition of land by private industrial companies peculiarly difficult. There have been three, and are at present two, great barriers to be surmounted by the Industrial Company looking for land. General.

66. (1) The Alienation of Land Act of 1900 imposes the necessity of obtaining the Deputy Commissioner's sanction to an alienation of land where the alienor is a member of one of the scheduled "agricultural tribes." The obstructions of this Act are now reduced to a minimum by an amendment to the Punjab Land Administration Manual informing Deputy Commissioners "that alienation for the site of a workshop or factory should be sanctioned, where the above are satisfied that there is no attempt to evade the Act." The Act itself provides for exemption from its provisions, but such exemption can be given only by the Governor-General in Council. Laws and custom.

(2) The Pre-emption of Land Act gives to certain persons a right of pre-emption under certain circumstances. Such a right exists with regard to practically all agricultural land, and also

to certain urban immoveable property where a custom of pre-emption is proved. The Act provides two escapes from its own provisions, (1) by exemption which may be given by the local Government : (2) by a proviso that where a sale has been sanctioned by the Deputy Commissioner under the Alienation of Land Act, no right of pre-emption exists. Naturally district authorities advise recourse to the second method of evasion to avoid a reference to Government on the question of exemption, which has been very sparingly given, but this procedure necessitates delays which are utilized by relatives of an alienor for speculation in chances of black mail.

(3) There exists a custom in most tribes and villages, to the effect that ancestral property shall not be alienated except for necessity, *i.e.*, except to pay pressing debts, or to provide for the seller the ordinary means of subsistence. The right of contesting any sale belongs to the reversioners, and there is no bar to the suit until at least six years after the alienation. Nearly one-third of the cases tried by an ordinary civil judge are of this type, and of these about three quarters are speculative. This custom is the most serious impediment to the acquisition of land by private industrial companies, and, as there is no exemption obtainable, it affords a well known method of extorting money from infant factories.

67. That these difficulties are by no means theoretical will be demonstrated in the evidence of witnesses, the Dhariwal mills, the biggest industrial concern in the Punjab, being the greatest sufferer. Schemes of improvement at Dhariwal have been held up for a number of years because of these obstructions, and the management has to pay an absurdly enhanced price for any land it acquires. The Land Acquisition Act does not provide a solution, as the conditions under which Government may hold a private concern are very strictly laid down. Government has agreed in principle to provide a certain reserve of land in the Canal Colonies, which can be sold, as required, to approved industrial companies in order to facilitate the acquisition, by exchange, of land required by them for industrial purposes.

SECTION XIX.

MONEY ADVANCES TO WORKMEN.

General.

68. There are evidences that the relations of capital to labour, and of employer to employed, call for the consideration by Government. Few customs have such a malign influence on the industry of the province as that of giving advances to workmen. It is a canker which is eating at the root of many industries ; the carpet, cutlery, hardware, weaving, industries and saltpetre refining all suffer from it. It is predominant where the factory is beginning to emerge from its initial difficulties, and may turn the scale, hanging between success and failure. By its means an unfair system of competition between different employers is in vogue, a workman being attracted from one workshop to the other by offer of a higher advance ; the more unscrupulous the employer and the longer his purse the greater his chances of success. Large sums are always out on advance to workmen. A saltpetre refinery with a capital of Rs. 50,000 was found to have as much as Rs. 20,000 advanced to workmen. Of this amount at any time not more than 10 per cent. is recoverable, and considerable sums must be written off every year. Again workmen become so heavily involved that their work loses efficiency. They know that no wage will be paid to them, that the employer has no

real power over them, and hence become lazy and inefficient. Of course it must be admitted that this system may safeguard the workman against a dishonest employer, who may, by fines and refusals to pay, try to cut down remuneration below the level of a living wage.

69. The only methods of redress at present are (a) a costly civil suit, which is more likely to involve the plaintiff in still greater loss, and (b) in certain cases a criminal action under the Labourers' Act. Employers' suggestions for removing the difficulty all take the form of a recommendation to tighten up this Act. At present it applies only to certain classes ; moreover it has in the past so often been used as an instrument of oppression that courts are very chary of enforcing it, and in many districts there exists a standing order enjoining on magistrates the extreme necessity of care in the administration of the Act. Action along these lines will not be profitable. It will merely afford employers an excuse for perpetuating the custom of advances. It is the advance itself which must be attacked. It has been suggested that such advances, or at any rate advances beyond a certain amount, should be made irrecoverable. Certain employers have gone so far as to suggest that givers of advances should be penalised, to checkmate the unscrupulous employer with the long purse.

Present position, and the remedy.

Simplified
method of
adjudication.

70. At the same time a very much more summary and less costly method of adjudication between employers and ordinary artisans would seem to be called for, such a benefit as has been conferred by legislation on the zamindar in the Redemption of Mortgages Act. At first it would benefit the employer more than the employee, but the latter would soon learn to avail himself of its privileges, and to him it would be especially useful in the absence of any machinery for airing grievances.

SECTION XX.

OCTROI.

71. Municipal taxation in the Punjab is still, generally speaking, the somewhat mediæval octroi system. Various unimpeachable principles are laid down in various Government resolutions ; articles to be taxed must be the main staples of consumption, and must be as few as possible. Every municipality's schedule of rates must have the Local Government's sanction. It is accepted as a principle that as far as possible the normal course of trade should be left undisturbed, and that the raw materials of manufacture should, if possible, be left alone : hence the practice of refunding the tax on imported articles which are later exported. Such a system must in any case be considerably complicated : but it will become doubly so when it has to provide for all the shifts and devices common in this country in the attempt to evade payment. As a result of this complexity, manifold grievances and inequalities emerge.

72. In 1910 it was represented to this department that there was a considerable quantity of soap exported from Amritsar, one company, the General Mills Company, manufacturing it on a fairly large scale. The oil used in the manufacture paid octroi at annas 5 per maund, caustic

General.

Octroi on raw materials of soap.

soda at 6 pies per rupee (in addition to the 5 per cent. customs duty), while no refund was allowed on soap. A reference of the matter to the Municipal Committee, Amritsar, elicited only a definite refusal to give a refund, or to cancel taxation on oil or caustic soda. In Rawalpindi the ingredients of soap paid octroi as follows : oil $6\frac{1}{2}$ annas per maund, charbi (fat) 6 pies per rupee, and caustic soda 9 pies per rupee. The refund on soap was $2\frac{1}{2}$ annas, while the amount of octroi paid by one maund of raw materials was $6\frac{1}{2}$ annas. In Gujranwala at present the case of soap is much the same as in Rawalpindi, the amount paid on raw materials giving one maund of soap being $5\frac{1}{2}$ annas, the actual refund being $2\frac{1}{2}$ annas. In Ludhiana and Multan the raw materials of soap pay octroi, while there is no refund allowed on export of soap.

Octroi on
iron.

73. It was represented by Hari Ram and Sons, Rawalpindi, that the octroi on flat iron was at the rate of 9 pies per rupee, weight being noted : refund is allowed by weight at the same rate of iron. Thus nothing is allowed on wastage which may be considerable. On articles imported for repairs octroi has to be paid, and, should there be a diminution of weight, so much less refund will be granted. The proprietor of a small foundry in Multan declared that rather than submit to the annoyance and delays of refund hunting he preferred to lose Rs. 150 per annum.

In Wazirabad iron pays 6 pies per rupee. The minimum refund is 8 annas. The Krishna Cutlery Works submit that they lose annually a considerable sum because of octroi in wastage, because of the export of small parcels of goods, and because in large parcels it is impossible adequately to reckon the proper amount of iron.

74. In Multan there is octroi on imported kanch for bangle-making, but no refund on exported bangles. In Panipat a kumkuma factory pays octroi at the following rates :—

Octroi on raw materials for glass manufacture.

			Rs.	A.	P.
50 maunds saji	..	..	7	0	0
60 maunds sandstone	..	..	0	6	0
18 maunds lead	..	..	3	0	0
• 2 seers tin ..	..	..	0	1	0
1,500 maunds wood	..	..	4	0	0

The above quantities produce about 80 maunds of kanch in 20 days. No refund is allowed, so that compared with another factory outside the octroi barrier there is a loss of Rs. 200 or some such amount on the year's working.

75. Such are actual grievances which have actually come to notice ; a search for complaints would find an ample crop. Undoubtedly the general defects of octroi rendered the system inimical to the growth of industry. The inevitable delay in the delivery of consignments or in their transportation, caused usually by press of work on the establishment, but frequently by

Other grievances.

the deliberate obstruction of the latter, is well known to any one who has tried to clear goods from a station. There are large openings for corruption : it is easy to hold up goods in a case where time means money, and a coin meant for municipal revenues passes into the pocket of the moharrir. The refund system, designed though it is to free from the burden of a tax re-exported goods, in reality falls short of its object. The ordinarily busy trader or manufacturer has not sufficient time to spend on the formalities necessary for obtaining refund, and sells his rights at a discount to the dalal or speculative broker. Where, as in the case of Wazirabad, there is a minimum refund, many hundreds of rupees are lost on small parcels. Sialkot has given an example of departure from stereotyped practice in the case of Uberoi, Limited. No octroi is paid by this firm, but sale and cash books are open to municipal inspection, and the firm pays a lump sum periodically for goods sold within the octroi limits of Sialkot. Such a system might be applied to many firms of proved respectability. Indications are not however wanting that some of the more progressive elements of the Punjab are showing a preference for the idea of the "terminal tax", which has already been introduced in one municipality, or even for a house-tax.

SECTION XXI.

RAILWAY RATES.

76. It has always been a habit and a tradition in all countries to attack the existing Railway authorities on the score of inequality and injustice of Railway rates ; and yet it is a subject which laymen must approach with peculiar caution, being technical in a lesser degree only than exact scientific knowledge. In India attacks have always been pressed with peculiar virulence, but most often with vague and inexact knowledge. The Punjab Industrial Conference of 1911 passed a general resolution concerning railway rates (Resolution 7, App. I), embodying the familiar complaint that the export of raw produce, and the import of manufactured articles is favoured in-preference to local traffic and the export of manufactured articles ; that there is, in fact, preferential treatment accorded to import of manufactured articles. On the principle of this resolution the then Director of Industries addressed Government, pointing out that there seemed to be, in certain cases which he specified, no connection between the railway rate and the distance for which the goods were conveyed, that one found sometimes a lesser charge for a longer distance. This letter did not receive a reply, but recent discussions on the subject have shown that the Railway has a com-

Theory that
indigenous
manufactures
are penalized.

plete answer in every case; that local conditions and direction of traffic or length of lead justify a rate which has never been fixed by mere arbitrary rule of thumb. Recently, in connection with the visit of the Commission, members of the Provincial Committee were asked to give details of any instance where railway rates were unfair. Not a single reply was received, and in one case, where a general allegation had been made, a request for figures elicited the answer that figures could not be given. The general complaint was made by the Manager of the Upper India Glass Works, Ambala. A reference to the Railway Officers for information proved that to Karachi, Bombay and Howrah from Ambala, and from these ports to Ambala respectively the freight on glass chimneys (the speciality of the Upper India Glass Works) was exactly the same. Not only so, but glassware packed booked at owner's risk is charged at rate half pie per maund per mile *plus* terminals when booked from—

- (1) Karachi City or Kiamari to any North-Western Railway station and *via* distant 200 miles or over.
- (2) Ambala City or *via* Shaharanpur (for traffic from Dehra Dun) to any North-Western Railway station and *via*.

That is to say local traffic from Ambala has an advantage over Karachi inland traffic, in not

being fettered by a 200 miles minimum distance. In fact to take typical Punjab cases, the local traffic seems to receive considerable natural protection; rates per maund for glassware packed at owner's risk from Ambala City and Karachi to Rawalpindi, Peshawar and Multan City are as follows :—

From	To		
	Rawalpindi.	Peshawar City.	Multan. City.
	Rs. A. P.	Rs. A. P.	Rs. A. P.
Ambala	0 15 7	1 4 0	0 15 6
Karachi	2 5 11	2 7 8	1 8 7

Thus in this instance the complaint seems effectually to have been disposed off. The absence of organization in Indian markets and business generally introduces further complications. As a rule in other countries goods moving towards the port and goods moving from the port are different. But in India one finds that manufactured articles are conveyed from the town of origin to the port and thence back to the interior. For instance, a Delhi firm manufacturing sulphuric acid asked for concessions for Bombay and Karachi. Enquiry showed that the sulphuric acid sent to Bombay was re-booked to Ahmadabad and district, and that that

booked to Karachi came back into Sind and often into the Punjab : and the obvious suggestion of the Railway authorities that a certain amount of freight would be saved, if the sulphuric acid were despatched direct to the customer, was considered quite impossible to ignore the facts of the case.

Concessions.

77. Thus one must come to the conclusion that the charge discussed above is not proven : that at any rate sufficient information has not been furnished to us which can bear the criticism of the officers in charge of rates. There have been no well sustained allegations that the North-Western Railway is unduly niggardly in the matter of concessions. In certain cases concessions have been withdrawn, but only after it has been proved that either the concession was misused, or that circumstances had made it unnecessary. A concession granted on soda for Ambala for the benefit of the Glass Works was withdrawn when it was found that Ambala was becoming an entrepôt for washing soda. Concessions for the import of loose cotton from Peshawar and district to Lahore ceased to be necessary after large numbers of ginning factories have been set up in Peshawar and other places nearer than Lahore.

Inequality of treatment.

78. A certain amount of irritation is caused by the inequality of treatment from different railways. In a certain case the Managing Director of the North India Chalk Pencil Company, Guj-

ranwala, applied through the Director of Industries, to various railways for concessions. He was treated with generosity by the North-Western and East Indian Railways, with a certain amount of consideration by the Bombay, Baroda and Central India and Great Indian Peninsular, but received a curt refusal from the Southern Mahratta Railway.

79. Thus no general and sweeping alterations in rates seem to be called for in this province; nor can it be said that the treatment of indigenous industries is entirely unsympathetic. It seems that a greater intimacy of relations between the Railway and the Industries Department could smooth many difficulties, and either the appointment of a representative of Industry on the existing Railway Board, or the formation of a Board, where the Railway is represented equally with the Department of Industries, would not only expedite decisions, but would save a great deal of unnecessary correspondence.

Suggestions.

APPENDIX I.

List of Members of the Punjab Industrial Conference held at Lahore on February 18th, 1911.

The Hon'ble Mr. J. M. Douie, C.S.I., 1st
Financial Commissioner, Punjab.

The Hon'ble Lieut.-Col. C. G. Parsons, Com-
missioner, Lahore.

The Hon'ble Mr. H. P. Tollinton, Secretary
to Government, Punjab.

The Hon'ble Mr. R. A. Mant, Financial Sec-
retary to Government, Punjab.

Sir David Masson, Kt., C.I.E., Punjab Bank-
ing Co., Limited, Lahore.

The Hon'ble Mr. J. Currie, Punjab Chamber
of Commerce.

The Hon'ble Khan Sahib Sayad Mehdi Shah,
Rais, Gojra, District Lyallpur.

Maulvi Abdul Ahad, Mujtabai Press, Delhi.

Mr. D. W. Aikman, Sanitary Engineer,
Punjab.

Mr. W. Armstrong, Manager, New Egerton
Woollen Mills Co., Limited, Dhariwal.

Mr. Ashford, Amritsar.

Mr. J. H. Barnes, Agricultural Chemist.

Commissioner F. Booth-Tucker, Salvation
Army, Simla.

Rai Bahadur Lala Barkat Ram, Sub-Registrar, Gujranwala.

Mr. Biernacki, Loco. Superintendent, Lahore.

Rai Sahib Bishambar Nath, Executive Engineer, Delhi.

Mr. M. Crosse, Inspector of Schools.

Rai Sahib Dewan Daya Kishen Kaul, C.I.E.

Mr. H. D. Douglas, Director of Sericulture, Srinagar.

Mr. C. P. Fisher, Conservator of Forests, Punjab.

Mr. Fraustadt, Amritsar.

Sardar Ganda Singh, Uberoi, Honorary Magistrate, Sialkot.

Lala Gobind Ram, son of Lala Hari Ram, of the firm of Messrs. N. D. Hari Ram and Brothers, Rawalpindi.

Mr. W. S. Hamilton, Director of Industries and Land Records, Punjab.

Lala Harkishen Lal, Bar.-at-Law, Lahore.

Lala Jai Kishan of Amritsar.

Mr. A. Langley, Registrar of Co-operative Credit Societies, Punjab.

Mr. A. Latifi, Assistant Commissioner.

M. Mahbub Alam, "Paisa Akhbar," Lahore.

Mr. W. Maxwell, Postmaster-General, Punjab.

Mr. S. Milligan, Deputy Director of Agriculture, Punjab.

Rai Bahadur Lala Mohan Lal, Lahore.

Mr. F. Noel Paton, Director-General of Commercial Intelligence.

Lala Panna Lal, Upper India Glass Works, Ambala.

Mr. W. C. Renouf, Director of Agriculture, Punjab.

Rai Bahadur Lala Ram Saran Das, Lahore.

Sardar Bahadur Bhai Ram Singh, Principal, Mayo School of Art.

Lala Raj Narain, Bar.-at-Law, Delhi.

Professor Ruchi Ram, Sahni.

Khan Bahadur Sheikh Ghulam Sadiq, Honorary Magistrate, Amritsar.

Mr. J. Scafton, Punjab Oil and Flour Mills, Lahore.

Sardar Shabdev Singh Uberoi, Sialkot.

Lala Shankar Lal, Hissar.

Mr. F. C. Waller of Messrs. Waller and Co., Delhi.

Rai Bahadur Sardar Boota Singh, C.I.E., Rawalpindi.

Resolutions passed by the Punjab Industrial Conference on February 18th, 1911.

I.—GENERAL MATTER.

1. (a) That the Department of Industry should be controlled by a Director of Industries who should be a whole time officer assisted by an Advisory Board.

(b) That the Board of Industry should consist of several members in addition to its head.

(c) That the members of the Board of Industry should be nominated by the Lieutenant-Governor and membership should be honorary, but travelling and halting allowance under the Civil Service Regulations should be paid.

(d) That the members of the Board of Industry should, by preference, be—

(a) A chemist or a chemist and metallurgist combined.

(b) A mechanical engineer with a knowledge of machinery as applied to industries.

(c) Two business experts with a sound practical knowledge of business.

(d) Two financial experts such as managers of banks.

(e) A mining engineer or mineralogist.

(f) A member of the educational department.

(g) The Registrar of Co-operative Societies.

2. That the duties of the department should be—

- (a) The collection and ledgering of information likely to be used in any of the industries in existence or suitable for creation in the Punjab and rendering such information available for the public.
- (b) The assisting of all enquiries on technical subjects by chemical investigation, advice regarding machinery and generally by information of all sorts.

Note.—The conference is of opinion that payment may reasonably be demanded for chemical analysis.

3. That it would be useful to appoint district correspondents to the Director of Industries.

4. That it is generally inadvisable for Government to establish model factories.

5. The Government can assist industries by—

- (1) exhibiting and demonstrating the use of improved appliances, machines and industrial processes ;
- (2) publishing leaflets on industrial processes ;
- (3) encouraging district exhibitions ;
- (4) disseminating information through the agency of the press ;

6. That co-operative societies of workers are useful, provided that the industries for which the societies are found are commercially sound.

7. The disabilities under which the local bulk industries labour and the disadvantages which they encounter in comparison with similar products imported into the Punjab result very considerably from the irregularity of railway freights from and to the exporting port. The combination of unfortunate circumstances which affect so prejudicially the local manufactures may be summarised as follows :—

- (a) Comparative cheapness of carriage of raw material to Karachi due to the impression that the main Railway Goods Traffic is export.
- (b) Cheapness of carriage of imported manufactured goods on the plea that these come as a wind fall for the wagons which ordinarily should have travelled back empty.
- (c) Heavy rates of carriage of locally manufactured goods because of their being higher in value than raw materials.
- (d) The prejudicial working of a telescopic system of railway freights in the case of locally manufactured goods, as very often the raw material has to encounter several breaks in the journey.

The above factors combine to create a sort of protection in favour of foreign manufactures. It is therefore recommended that—

- (1) freights on raw materials and articles manufactured out of the same should be at the same rates, *e.g.*, freights on oil-seeds and oil should be at the same rates :
- (2) freights on the same articles whether manufactured in India or abroad should be the same, *e.g.*, freights on English yarn and Indian yarn be at the same rates to and from Karachi :
- (3) when a raw material has to travel to a factory and the manufactured article has to go out also by rail, freights for the two journeys should be equal to the freight which would have been payable if the raw material only had taken one journey from the starting station to the destination of the manufactured article ; and this can be done by giving proper rebates.

8. That with a view to the fostering of industries, the department of industries should move the Government to require that the accounts of joint stock companies should be submitted to competent audit. It seems most important to provide a large measure of protec-

tion for investors and thereby to inspire public confidence. There should also be stricter control by the institution of prosecution by Government in cases of dishonesty.

9. That the conference urges that Government should take early measures to remove the obstacles to the acquisition of sites required for factories and for industrial and commercial purposes caused by the existing provisions of the Pre-emption Act and the Land Alienation Act read with the executive instructions.

II.—INDUSTRIAL EDUCATION.

10. That the conference, while recognising the value of the resolution of the sub-committee quoted below, is of opinion that there has not been sufficient time in which to frame an adequate scheme of industrial education. It therefore recommends that Government should appoint a small committee which shall, after considering the resolutions passed by the sub-committee, and after inviting opinions from persons competent to give them, frame a practical scheme of industrial education.

The conference further recommends that Government should inform the committee what funds will be available for industrial education in the near future in order that such a scheme may be prepared as may be introduced at once.

(i) That industrial schools should be established at the centres of important industries where

up-to-date methods (under expert management), especially applicable to the industries of that locality, be taught—

- (a) To boys and girls from 5 years old and upwards,
- (b) Also to adult men and women, and
- (c) That to the more flourishing of such schools advanced classes of more technical type be added, as occasion demands.

That the said schools should endeavour to train instructors who could subsequently be employed in promoting the introduction of improved methods and appliances in trades carried on by artizans working in their own houses or in small workshops.

(ii) For the schools contemplated in resolution (i) the proportion of work hours should be as follows :—

First stage.— $\frac{2}{3}$ general education and $\frac{1}{3}$ craft education.

Second stage.— $\frac{1}{2}$ general education and $\frac{1}{2}$ craft education.

Third stage.— $\frac{1}{3}$ general education and $\frac{2}{3}$ craft education.

Provided that any boy, if the Principal of the school so desires, may devote the whole of his time to craft work.

Proviso I.—These proportions should by no means apply to the adults mentioned in resolution (i) nor to the advanced classes mentioned therein who would devote all their time to craft work.

Proviso II.—“ Physical drill ” and “ Object lessons ” as the expressions are understood in the Education Department, should not be included in the proportion devoted to craft work.

Proviso III.—For the purposes of this resolution literary education shall (apart from drawing and clay modelling and such practical instruction) be understood to mean only education in ordinary vernacular, reading, writing, arithmetic and elementary geography (of India), and in the third stage a little English, comprising reading, writing and conversation so as to enable foreman's orders and instructions to be understood.

(iii) There should be no restriction on the classes of boys admitted to the schools, except that boys who are not the sons of artizans should be charged fees, which should be pitched low.

(iv) That Government schools should not be conducted as workshops working for a profit, and that in any case the products from such schools (if so conducted at all) should be sold to private orders and at prices which will not undersell the general market.

That grants by Government to private industrial schools should be regulated by the efficiency of the schools and given under grant-in-aid rules and not according to the profit or loss being made by the schools, and that the grant-in-aid system requires further development.

(v) That the individual or body contributing the funds should manage the schools, and that the functionary in immediate charge of each individual school should be a man who has received a technical education such as is contemplated by the schools now recommended, only to a higher and collegiate standard.

For example (a) a man might be sent for training at the expense of Government or of a local body to the Victoria Technical Institute, Bombay, the Rurkee College, or to the Serampur Weaving School, Bengal, or to other similar institution in India, or (b) it might be found more satisfactory to entertain such graduates of these institutions who had actual practical experience, or (c) even to entertain experts imported from foreign countries.

11. That the industries in which schools are required are —

1. Pottery.
2. Metal work, including cutlery.
3. Woodwork, including carpentry and cabinet making.

4. Cotton weaving.
5. Spinning and weaving of silk and wool.
6. Knitting and hosiery, particularly for women workers.
7. Lace and drawn thread work, particularly for women workers.
8. Kandla and gold and silver lace work.
9. Nickel plating.
10. Lacquer work.

That it should be left to the Advisory Board to advise in what places the schools should be established.

12. That industrial education should be administered by the Director of Industries and the Advisory Board assisted by an expert industrial inspector imported from Europe.

13. That particular stress is laid on the great efficacy of the apprentice system, and that it is not only legitimate but advisable to give grants to factories for the training of apprentices, provided, however, that the factory receiving a grant is required to permit official inspection by the Director of Industries or his officers, to see that the apprentices are receiving proper training.

III—SPECIAL INDUSTRIES.

14. *Tanning*—Difficulty—Want of up-to-date technical knowledge.

Recommendations (1).—That the present system of curing hides and skins for the market is

defective and the department of industries should institute enquiries into the matter. (2) That there should be expert enquiries as to the places where improved methods of tanning could be introduced with advantage having regard to the supply of raw materials, to water, labour and tanning materials. (3) That Government should make arrangements for the practical training of youths in up-to-date tanneries already in existence in India by a system of premiums or otherwise.

15. *Oil-Pressing.*—Difficulty—Castor-seed. There is difficulty in disposing of castor cake at remunerative rates in the Punjab. Also the supply comes only from the United Provinces.

Recommendations.—That as the only use of castor cake is for manurial purposes, manure rate might be conceded by the railway.

16. *Cotton seed.*—Difficulties—(1) It is believed that if half the price of cotton seed can be obtained for the cake, pressing will pay.

(2) Inferiority of local seed out of which only 15 per cent. oil can be extracted.

(3) Dearness of seed—cost being greater in the Punjab than in the United Provinces.

Recommendations.—(1) That an experimental distribution of cotton cake on payment of one-half the cost of cotton seed be undertaken

by the agricultural department conjointly with an established factory in order to test the market for the by-product.

(2) That it is premature to start oil refineries.

17. *Fibres*.—The question of fibres is already receiving the special attention of the agricultural department, and the conference have no suggestions to offer.

18. *Wood pulping*.—Information is required on the following points :—

- (i) The tracts in which wood suitable for pulping can be found ;
- (ii) An estimate of the number of the trees available for pulping annually for an indefinite period and also the number per acre :
- (iii) The probable cost of the standing trees by girth measurement :
- (iv) Probable cost of carriage of the timber to the railway line where in all probability factories would be established.

19. *Match making*.—The monograph published recently by the Government of India contains all necessary information on the subject, and the conference have no further suggestion to offer.

20. *Glass making.*—Difficulties—The chief difficulties are—

- (1) Cost of alkali.
- (2) Cost of coal.
- (3) Want of skilled labour.
- (4) That any factory to pay must include the manufacture of window and plate glass and bottle making by machinery. This entails a larger capital than has been at the disposal of companies hitherto established.

Recommendations.—(1) In view of the above considerations great care should be taken in the starting of glass factories in the Province.

(2) With regard to existing concerns liberal conditions as to railway freights might be made.

(3) That a careful survey be made by Government of the quartzes and sands in the Punjab suitable for glass-making, samples being collected through local agencies to guide an expert of the Geological Department, who should carry out a detailed survey subsequently. That with a view to the establishment of glass factories in the province enquiries should include the location of the other substances necessary to the industry such as soda and lime-stone.

21. *Hosiery.*—*Recommendations.*—(1) That knitting classes, especially for *parda-nashin* women on the lines of the one at Bara Banki,

should be established in places such as Lahore, preferably in connection with existing educational institutions.

(2) That the establishment of a knitting machine industry is not sufficient to guarantee success, but proper arrangements must be made to supervise the necessary supplementary work such as stitching, washing, etc., and for the supply of material and the disposal of products.

22. *Dyeing.—Recommendations.*—That a class for the dyeing of yarns and fabrics with fast colours should be established in connection, if possible, with an existing educational institution in Lahore, on improved methods with both indigenous and foreign dyes.

23. *Sugar refining.*—That any improvement in sugar manufacture as distinct from gur making must depend upon concentration on a large scale by co-operation or otherwise, and until this is possible in the Punjab the matter is rather an agricultural than an industrial question.

24. *Weaving.—Difficulty.*—The want of up-to-date technical education.

Recommendations.—(1) That Government should give a further grant to the Ludhiana Weaving School to enable it to purchase dobbies and jacquered looms and to improve its dyeing and sizing processes.

(2) That travelling exhibitions of improved weaving appliances should be given a fair trial.

25. *Pottery and crockery*.—That the use of glazed pottery for domestic purposes is likely to increase rapidly in the province where there is already a small manufacture of cheap glazed pottery utensils. The investigation of the most useful type of firing kiln is recommended as this seems at present to be the weak point of the industry.

In view of possible extension, a survey of the clays, marls, quartzes and other pottery materials of the province is desirable.

26. *Gold and silver tinsel*.—The Delhi hand industry is very seriously affected by the competition of machine-made tinsel and wire from Europe, and seems likely to disappear altogether. The processes in use in Europe are jealously guarded. The best chance of success seems to consist in enquiries by the department of industries from the makers of machinery for rolling and drawing metals. It is noted that the Madras Government had instituted enquiries through Mr. Chatterton as regards the more economical European methods and have promised to apprise the Punjab Government of the result.

27. *Metal foundries*.—There appear to be no serious difficulties in the way of development.

28. *Chemical industries*.—There are two factories for sulphuric acid at Delhi and two at Lahore, the raw material being imported from

Sicily. These industries are favoured by the heavy freights on imported sulphuric acid. The Geological Department is making the necessary survey of the resources of the province as regards sulphur and sulphur compounds. As soon as a demand arises for sodium, carbonate, and caustic soda there would appear to be no difficulty in manufacturing these in large quantities in the Punjab from the existing deposits of sodium chloride, provided electric power is made available.

29. *Soap and glycerine.*—Two kinds of soap are in use—toilet soap and soap for washing clothes. The raw materials for both are available. Dhobi soap is largely manufactured locally and gives satisfaction. No action seems to be necessary in this connection. As regards toilet soap there is an up-to-date factory at Meerut, and there are some small institutions in the Punjab, but the local products do not compete successfully with imported soaps. The reason for this would appear to require investigation. Attention might especially be directed to a comparison of prices, qualities, distributing agencies and disposal of by-products, such as glycerine.

30. *Industrial alcohol distilling.*—The valuable note by Mr. Barnes may be taken as a guide for the department of industries in preliminary work needed in this connection.

31. *Use of waste products of tanning.*—The chief waste product of tanning is glue, and as there is a considerable export of hide parings the department should consider why capital is not attracted to the starting of a glue factory, especially as size is largely used in textile industry. The causes of inaction may be the cost of fuel or perhaps prejudice.

APPENDIX II.

List of Industrial Schools at present—1917—established in the Punjab.

LAHORE DIVISION.

For Boys.

		<i>Established.</i>	<i>Industries.</i>
1. Mayo School of Art, Lahore	...	1875	Carpentry, metal work, pottery.
2. Railway Technical School, Lahore	...	1889	Carpentry, metal work.
3. M. B. Industrial School, Amritsar	...	1886	Ditto ditto.
4. V. D. J. Hindu Technical Institute, Lahore	... ..	...	...
5. St. John Mission Industrial School	...	...	Carpentry, metal work.
6. D. B. Industrial School, Kasur	...	...	Ditto ditto.
7. Casson Industrial School, Gujranwala	...	...	Ditto and weaving.

For Girls.

Industrial Girls' School, Pasrur	...	...	...
Mission Industrial School, Clarkabad	...	...	...

JULLUNDUR DIVISION.

For Boys.

8. D. B. Industrial School, Ludhiana	...	1896	Carpentry, metal work.
9. Dane Weaving School, Ludhiana	...	...	Weaving.
10. D. B. Industrial School, Ferozepore	...	1914	Carpeting, hosiery and lace making.
11. M. B. Industrial School, Hoshiarpur	...	1910	Tailoring & carpentry.

AMBALA DIVISION.

For Boys.

			<i>Established.</i>	<i>Industries.</i>
12.	M. B. Industrial School, Ambala	...	...	Carpentry and tailoring.
13.	" " " Delhi	...	1890	Carpentry and metal work.
14.	Cambridge Mission Industrial School, Gurgaon	...	...	Shoe-making, tailoring and carpentry.
15.	D. B. Industrial School, Hissar	...	...	Weaving.
16.	" " " Rohtak	...	...	Carpentry.
17.	" " " Jhajar	...	...	Shoe-making and weaving.
18.	M. B. Industrial School, Rupar	...	...	Carpentry, modelling.
19.	" " " Rewari	...	...	Carpentry.
20.	D. B. Industrial School, Karnal	...	...	Ditto.
21.	Primary Industrial School, Kot Khai (District Simla)	...	...	Ditto.

For Girls.

Baptist Aided Indigenous School, Salamatpur (Gurgaon)
---	-----	-----	-----

MULTAN DIVISION.

22.	D. B. Hardinge Technical School, Lyallpur	...	...	...
23.	D. B. Primary Industrial School, Jhang	...	...	...
24.	" " " " Chiniot	...	...	Carpentry and blacksmithy.
25.	" " " " Muzaffargarh	...	...	Carpentry and weaving.
26.	M. B. Technical Institute, Multan	...	...	Ditto. ditto.
27.	D. B. Industrial School, Montgomery	...	...	Ditto ditto.
28.	" " " D. G. Khan	...	...	Ditto ditto.

RAWALPINDI DIVISION.

29.	M. B. Industrial School, Kalabagh	...	...	Carpentry and blacksmithy.
30.	D. B. Industrial School, Kot Fateh Khan	...	...	..

APPEN
WEAVERS'
Balance

Year.	Class of Society, i.e., I, II, III, IV, V or VI.	No. of Society.	ASSETS.									
			Cash in hand and bank.	Value of investments.	Loans due by members.	Of which overdue.	Loans due by Societies.	Of which overdue.	Interest due to Society.	Value of stock in hand.	Other items.	Total.
1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Weavers' Co-opera</i>												
1911-12	...	13	8,654	40	6,751	68	3,903	...	58	5,933	...	25,389
1912-13	...	10	3,452	132	14,068	750	3,280	...	396	6,598	...	27,921
1913-14	...	12	3,621	212	16,416	195	3,354	...	825	5,053	...	29,991
1914-15	...	12	2,914	212	16,461	946	4,650	...	1,285	11,375	15	36,912
1915-16	...	12	2,718	927	18,436	.	977	.	1,883	15,248	.	39,684

DIX III.

CO-OPERATIVE SOCIETIES.

sheet.

LIABILITIES.												
Loans and deposits from non-members.	Loans and deposits from other societies.	Loans from Government.	Deposits of members.	Share capital.	Interest and dividend due by society.	Cost of managements due.	Other items.	Reserve Fund, i.e. undistributed profits under section 33 of Act II of 1912.	Total.	Profit + and Loss —	Purchases.	Sales.
14	15	16	17	18	19	20	21	22	23	24	25	26
<i>tive Societies.</i>												
2,346	2,587	4,000	1,652	13,957	125	11	...	135	24,313	+ 576	34,811	31,053
4,396	7,518	4,000	1,075	8,791	274	89	..	452	26,595	+ 1,326	50,160	48,668
3,532	7,909	4,000	845	9,816	576	338	24	967	28,007	+ 1,984	47,490	50,845
6,054	9,508	4,000	2,051	9,720	445	381	49	1,138	33,646	+ 3,266	88,011	33,357
9,976	13,388	...	1,145	7,398	370	5	53	2,553	35,028	+ 4,056	58,043	56,797

APPENDIX IV.

Report of the Committee on Industrial Education
in the Punjab, 1911-12.

PRELIMINARY MEETINGS.

Scope of the enquiry.

Composition
of the Com-
mittee.

The Committee appointed to draw up a scheme of Industrial Education for the Punjab consisted of—

The Hon'ble Mr. J. C. Godley, Director of Public Instruction.

W. S. Hamilton, Esquire, I.C.S., Director of Agriculture and Industries.

J. Ashford, Esquire, Public Works Department, Superintendent, Canal Workshops, Amritsar.

Khan Bahadur Sheikh Ghulam Sadiq, Amritsar.

Lala Gobind Ram, Sethi, Rawalpindi.

L. Heath, Esquire, Vice-Principal, Mayo School of Art, Lahore.

W. T. Wright, Esquire, Inspector of European Schools,—*Secretary*.

Previous to the assembling of the Committee a note by Mr. Hamilton regarding industrial education (in English and Vernacular) was circulated to all Deputy Commissioners and gen-

plemen likely to be interested in the question, together with a series of questions upon which views were asked.

2. The Committee assembled in Lahore on Monday, October 16th 1911, when all the members were present. The President (the Hon'ble Mr. J. C. Godley) opened the proceedings with an address dealing with the general questions to be discussed. He also drew the attention of the Committee to the various recommendations made in the past, especially to those of the Simla Educational Conference of 1901, which laid down that all technical instruction should be on a basis of general education, and that industrial schools should be craft schools and not concern themselves with general education.

Opening
Meeting.

3. After a preliminary discussion the Committee decided to separate into two parties,—one, consisting of Mr. Godley, Mr. Ashford and Lala Gobind Ram, to visit centres of industries in the north-western direction, and the other, with Mr. Hamilton, Mr. Wright, Mr. Heath and Khan Bahadur Shaikh Ghulam Sadiq, to visit centres situated to the south-east.

Arrange-
ments for
visits to cer-
tres of Indus-
tries.

Nature of the industrial instruction now given.

4. The Punjab industrial schools are organized in classes in the same way as the schools for general education. In addition to the ordinary literary subjects taught in primary or middle schools, instruction is also given in

The Training
afforded by
the present
Industrial
Schools.

carpentry or metal work or both. The course of instruction in carpentry is prescribed in a rigid progressive series of exercises, which begin with elementary carving with chisels (kingri work) and pass through planing, sawing and the making of joints to the construction of simple articles of furniture, such as school stools. In metal work the teaching is almost always confined to the making of simple tools and iron padlocks, which includes a number of useful operations. The children enter the school as young as five or six years of age. The teacher of the craft is a bazar mistri ; he may be illiterate, or he may have been a student of the Mayo School of Art. In no case is he a man who has had any instruction in the methods of teaching others. He often has a large class of twenty boys to supervise : he receives a fixed salary, which is in nearly every case inadequate to attract a thoroughly trained man, and he has no financial incentive to do good work.

Amount of
literary
training
given.

5. The amount of literary training given was reduced some years ago, with the result that the numbers in attendance in these schools subsequently decreased, especially on account of the curtailment of the course in English formerly taught. This measure has probably had the effect of removing pupils who did not seriously intend to take up one of the callings for which they were trained. The Committee consider the present proportion of time devoted

to general education and to industrial training to be on the whole satisfactory in the schools as at present constituted.

6. In the report on industrial education issued by the Committee appointed to consider the matter in 1903 the Punjab schools, unlike those of most other provinces, are said "to have attained moderate success, due perhaps to the natural bent of the people towards an industrial life rather than to the suitability of the methods adopted."

Report on Punjab Schools by the Committee on Industrial Education in 1903.

Since that date a few improvements in buildings and equipment have been carried out, but the lack of keen and efficient teachers on the industrial side remains.

•7. A fair proportion of the pupils in these schools are carpenters and blacksmiths ; a good many belong to children of other industrial classes, such as tailors or workers in gold tinsel ; and the rest are boys of the higher castes in poor circumstances. Even where aritsans are very numerous, as in Delhi, Amritsar and Ludhiana, the number of them who send their sons to the industrial schools is quite insignificant.

Classes from which pupils are recruited.

8. The school supplies the materials and the equipment, and any profits arising from the sale of articles are credited to the school account, and to this very small extent lessen the expense of maintenance.

Materials and equipment.

a man of purely-literary qualifications, is apt to attach too little value to the industrial side of the school.

12. The production of complete articles from the earliest stage possible is not aimed at ; thus there is no stimulus for a boy to do good work, and his natural desire to produce a finished article, worked entirely by himself, is thwarted.

Need for the production of complete articles.

13. Other weak features are—

Weak features.

- (i) Neglect of effective supervision of the boys' work at every stage, due to lack of efficient teachers and faulty methods. The pay offered is too low to attract really good craftsmen and teachers.
- (ii) Lack of thoroughness in the work done.
- (iii) Faulty tools, almost invariably the tools used in the boys' carpentry work are badly kept, and little attention is given to their proper preparation and sharpening.
- (iv) The need of closer connection between the school and the trade, in order to enlist the interest and support of the people most nearly concerned in the well-being of the school.
- (v) In some cases it was found that boys could easily work through the course .

in eight or nine months and were then made to go over and over the work again for the rest of the year. Progress is thus very slow. It was felt that the course in carpentry especially needed revision, and that too much time is given to kingri work. Boys are kept too long at making single joints, etc.

- (vi) Far too much time is spent in drawing from the flat. Object drawing of articles in every day use is not sufficiently practised. Too much time is given to model drawing of geometric objects, which does not appeal to pupils.
- (vii) Most of the schools appeared to be inadequately equipped with tools and appliances.
- (viii) The headmasters have had no industrial training ; thus it is open to question whether they are the most suitable men to direct intelligently the industrial side of the work.
- (ix) The class system of instruction on the industrial side has been criticised, in that it tends to retard the brighter pupils. A boy who is good in the handicraft taught may be kept back because he cannot read as well as his class-fellows.

*Views expressed at Conferences and by artisans
and people interested during the tour.*

14. The system of industrial instruction was enquired into in the schools visited, and the question was discussed with workmen and employers of labour in the shops. Some of the latter advocated the apprentice system, in which the craftsman is assisted by learners or apprentices. The aim of the trade workshop is, of course, to make a profit, and the training of apprentices is a secondary consideration. Beginners are not paid; but in a short time they are able to earn two or three annas a day. A craftsman would only have a few apprentices—three or four at the most—at one time.

Visits to
schools and
discussions.

15. There appeared to be a general demand for more thorough industrial training—

More thorough industrial training
needed.

(a) by teachers who, by their ability and zeal, were able to command the respect of people of the artisan class;

(b) by the introduction of modern methods;

(c) by the introduction of modern and improved tools and simple machinery.

16. As an inducement to good work, it was urged that pupils should receive the sale value of their work, less the cost of the material they use.

Pupils should
receive the
sale value of
their work.

17. Night schools were not generally desired even for those who are at present working as apprentices in small shops. It was urged, in

Night schools
are not
generally de-
sired.

regard to metal workers, that the men and boys are too tired to attend such classes, as the work is physically exhausting. Some employers thought that it might be practicable to curtail the hours of work in their shops for two days a week in order to afford an opportunity to attend night schools ; but at the same time they admitted that the wages of those who availed themselves of shorter hours would have to be reduced accordingly.

Views of Employers regarding the value of education for their workmen.

18. As a rule, employers thought that those who had gone through the ordinary primary course became more intelligent workmen, and that they were able to rise to a higher level and earn better wages than those who were illiterate. In Lala Janki Nath Joti Prasad's Copper Works at Delhi, however, the proprietor expressed doubts on the point.

Age for commencing industrial work.

19. In metal work and in some other trades boys are not strong enough to begin work in their fathers' shops till they reach the age of ten. Such boys, if Muhammadans, go to a Quran school for religious instruction till that age. Their fathers would prefer that they should spend this period in an industrial school if they were also taught the Quran.

Parents generally recognise the value of education.

20. Some employers were of opinion that parents would not send their boys to an industrial school after the age of 10 years, as they could then earn, to begin with, four annas a day in wages. But generally the fathers recognised

the value of education, and expressed themselves willing to send their sons to such schools, in order to train them to follow their own calling, if no fees were charged. Boys of seven years of age are often able to do light work in their own homes (filing, etc.), and thus to earn a little money; the parents, however, were in some instances willing to forego these earnings if their boys were admitted free to an industrial school and also received the price of the work done, even if the latter were less than the sum they could otherwise earn in their own homes.

21. Some headmasters of industrial schools considered that the eight years' work in (1) carpentry and (2) metal work, up to the middle standard, could be compressed into six years, and suggested that the syllabus needs revision accordingly, and that tinning and soldering should come before iron work. In all places visited there was a persistent demand for the teaching of new and improved methods and appliances, and in some cases for new industries.

Courses in
Carpentry
and Metal
work need
revision.

22. Before instruction can be given in improved methods and processes, and in the use of superior appliances, it is recognised that the instructors themselves must have gone through a complete course of training and acquired the necessary knowledge and skill. The most important industries need to be selected in which training should be given in industrial schools, and only thoroughly competent instructors should be

Need for
competent
instructors.

engaged for the work. It has been often urged that the head of such a school should be a European artisan,—one combining in himself the power of organisation and administration necessary to the well-being of a school, and also the expert knowledge of a mechanic or artisan for the industry in which a particular school would specialise. A school organised on these lines should be in a position to prove, by experiment, the value of improved methods and appliances, and might also be able eventually to train instructors.

23. At Amritsar it was suggested that the control of such schools should not rest with municipalities ; that there should be half-yearly exhibitions for the sale of the goods made ; and that the pupils should receive the price of their labour half-yearly.

Views and Recommendations of the Committee.

Schools of
special
industries.

24. While favouring the development, on sounder principles, of the industrial schools maintained by local bodies and private agencies, the Committee think that industrial schools of a more specialised type should be instituted experimentally by Government in selected localities. These schools of special industries should, they think, be placed under the charge of expert European artisans, who would probably be obtained on a salary of Rs. 350 rising to Rs. 500, or of Indians trained in Europe or America. Only industrial instruction should be imparted in these

schools, and no fees should be charged. As a rule, there should be a primary school attached as a feeder to these specialised schools in which ordinary general education should be given up to the primary standard combined with elementary manual instruction, the object being to attract children of the artisan classes. These specialised schools of industries should be open to all classes. Boys should not be admitted below the age of ten, and should have completed, if possible, the primary course of general education.

25. Localities suggested for the establishment of such schools are Sialkot and Rewari for metal work; Ludhiana, Lahore, Hoshiarpur and Amritsar for weaving; Kartarpur, Amritsar and Jullundur for wood-work. The members of the Committee who visited Sialkot formed the opinion that an expert English tool-maker in charge of a school of metal work might prove of much assistance to the local industries. The establishment of a school of pottery may also be eventually advisable; but for the present the Committee recommend that the pottery section of the School of Art be developed on the lines of industrial experiment.

Places suggested for the establishment of specialised schools.

26. The Committee think that schools of special industries on the lines suggested above should be entirely financed by Government, and that they might suitably be controlled by the Department of Industries, assisted in each case by an advisory committee of local employers.

Control of schools of special industries.

The inspection of these schools should, as far as possible, be carried out by experts.

Existing Industrial schools.

27. The Committee consider that the aim of the training imparted in the existing industrial schools, which is to afford literary instruction of a simple character, combined with hand-and-eye training and elementary industrial work, is a sound one. They doubt, however, whether general education beyond the primary standard is necessary for boys of the class which it is desired to attract to industrial schools, as such instruction tends to make pupils disinclined to follow their hereditary callings. They recommend, therefore, that in the case of new industrial schools, middle departments for general education should not be instituted, and that such further education as is desired should be optional, and imparted, when possible, in evening classes.*

Defects to be remedied.

28. The defects noticeable in the existing industrial schools are mainly due, in the opinion of the Committee, to unintelligent teaching on the industrial side, to insufficient equipment, and to inadequate supervision and guidance. Only competent teachers should be employed, and they should be paid a higher salary than they can otherwise earn in the bazar.

Notes to Industrial schools.

In order to raise the standard of industrial schools maintained by local bodies and Mission-

*Lala Gobind Ram would also desire that some instruction in English should be imparted as part of the general education given.

ary societies, the Government should offer liberal grants-in-aid to schools which reach a standard approved by Government and make adequate arrangements for efficient instruction in crafts. It is hoped that private schools will thus be induced to raise their standards so as to earn these grants.

29. The Committee also consider that the Mayo School of Art should develop its teaching department with a view to the supply of specially trained craft teachers.

Mayo School
of Art.

30. With regard to the internal economy of the schools, the Committee think that more elasticity of classification is advisable, pupils with a bent for industrial work being advanced to higher standards irrespective of their progress in classes for general education.

Elasticity of
classification.

31. As an incentive to good work, pupils should be allowed to receive the sale-proceeds of such work as can be disposed of, less the cost of material.

Disposal of
sale-proceeds.

32. The kingri work-laid down in the course of studies is considered unsuitable as a preliminary course. It is thought that boys should first be taught the correct method of using the saw, the plane and the chisel in the order named, and that kingri work should only be begun after the boys have learnt to sharpen their own tools. From the earliest stage possible the production of complete articles by the boys should be aimed at.

Carpentry
course.

- 1s. 33. The Committee consider that the most efficient tools should be introduced at each stage, machine tools; such as the fret saw, etc., being also used; and that the instructor should be held responsible for the condition of the tools.

J. C. GODLEY.

W. S. HAMILTON.

J. ASHFORD.

GHULAM SADIQ.

GOBIND RAM.

L. HEATH.

W. T. WRIGHT.

NOTE OF DISSENT BY MR. HAMILTON FROM PARAGRAPHS 25 AND 27 OF THE REPORT OF THE COMMITTEE.

I differ from the other members of the Committee in regarding it as essential that the proposed primary departments should invariably be attached to the special craft schools, which the Committee recommend should be established. My reasons are that I cannot accept as rational any system of education which does not include the three Rs. The special schools proposed by the Committee are to take boys of 10 years of age and upwards even if they are illiterate. In fact, these schools are to be workshops, not schools, and will not provide any means for the general education of the boys of weavers, carpenters and metal-workers. The boys of these classes do not at present go to school at all, and there is very little hope of their going to the ordinary schools in the future. The almost general opinion of these artisans in all large centres in which I have enquired is that they would welcome primary schools where three Rs. plus a handicraft—weaving, carpentry, metal-working, etc.—are taught by really competent masters, and send their children to them. Such schools would not lead the boys towards petty Government service, but would prepare them to make the best use of the special schools (or workshops) proposed and eventually to become skilled craftsmen. If

you are to attract artisans' boys to schools, it must be in their early years.

The provision of adequate inspection of industrial schools of the existing type, no less than of any special schools which may be created, is a necessary part of any scheme of industrial education. But the only recommendation on the matter in the Committee's report is a single sentence in paragraph 26 "the inspection of these schools" (*i.e.*, special schools) "should, as far as possible, be carried out by experts." In my opinion skilled inspection is essential and not a thing to be provided as far as possible, and the inspectors of existing industrial schools—on whose reports grants will depend—as well as of the special schools should be men with a practical knowledge of the craft taught,—where carpentry is taught the Principal, or Vice-Principal, of the School of Art might be the Inspector; where metal work is taught, an officer in the Locomotive Department of the North-Western Railway; where weaving is taught, the Textile Assistant to the Director of Industries. It would be better still if a special inspector of industrial schools where carpentry and iron work are taught was brought out from England and made responsible for the inspection of the literary side as well as of the craft work.

W. S. HAMILTON,

Director of Agriculture and Industries.

SUPPLEMENTARY NOTE BY THE PRESIDENT OF THE COMMITTEE.

I agree generally with the recommendations formulated by the Committee, except as regards the minimum age for admission to special schools of industries, which might, I think, be fixed at 12 or even 14 at the lowest, instead of 10.

I may perhaps be permitted to add a few supplementary remarks which may serve to dispel misunderstanding.

A school classed as industrial may help industries in two ways—

(a) *indirectly*, by giving general education to children of the industrial classes, combined with some manual training, the object being to improve the general intelligence of the workers ; and

(b) *directly*, by introducing more economical and efficient methods of industry, and thus raising up a generation of more skilful artisans.

It may also help to increase the number of workers, by attracting the children of non-artisans into industrial occupations ; and incidentally it may be a means of enabling orphans and children of indigent parents to earn a livelihood at an early age.

Now there is nothing in the history of industrial schools in the Punjab to show that (b)

has ever been proposed as an attainable object. The present scheme was originally drawn up in 1888, on the recommendation of a special committee, and the aim and scope of the schools were clearly stated by the Punjab Government in an explanatory letter to the Government of India. The scheme, it was said, was framed "with a special view to the fact that the son of the Punjab artisan, while receiving from his father or guardian instruction in manual work, has hitherto had no other education, and that when a workman's son attends school at all, it is almost always with a view to abandoning his hereditary pursuit. The object therefore is to do as little as may be to detach the young artisan from the workshop, and yet to give him, if possible, some useful theoretical and practical instruction. It has been decided to lay down a course of study for industrial schools embracing reading, writing, arithmetic, the geography of the district, of the Punjab, and of India, drawing and carpentry, of blacksmith's work, or such other handicraft as may be hereafter decided on. All industrial schools maintained or aided by local bodies will be required to conform to this course. They will be divided, like ordinary primary schools, into an upper and lower primary department, and will contain five classes. This measure will at least enable the sons of artisans to obtain some general education, and will tend, it may be hoped, to develop their

intelligence. Whether it will have any considerable effect in improving the artistic character or their workmanship can be seen only by actual experience, but His Honour considers that the experiment is worth a trial."

It will be seen from the foregoing that the programme was a comparatively simple one: there was no reliance on new and improved methods or the production of more technically skilled artisans. The main intention was to get certain classes of children into school, and the school course was modified so that they might receive an education suitable to their circumstances.

The fact that these schools have attracted a fair attendance, that most of the pupils have been children belonging to the industrial classes, and that most have taken subsequently to industrial occupations shows that the scheme has in some measure fulfilled the expectations of its originators. It need not be discarded as useless simply because the schools do not come up to a standard which there was no intention of applying.

This, however, is no reason why an attempt should not now be made to improve the character of the teaching in the existing industrial schools (which is largely a question of money) and also to set up schools of industry in the proper sense, *i.e.*, schools whose purpose is described in (b) above.

The Director of Industries appears to assume in the general note on the subject which he circulated before the Committee's enquiry that it is possible to give children from the ages of 5 to 14 a general education, while simultaneously turning them into skilled workmen at the end of the period. Such a feat has never been accomplished even in the most advanced European countries ; it implies a capacity in the school and the pupil which the best designed schemes cannot create. It is also suggested in the note that the mechanical processes of industry—of weaving, for example—are in themselves educative. But the mere acquisition of a mechanical aptitude does not necessarily quicken the intelligence. If it were otherwise, the children employed in the carpet-weaving factories of Amritsar might be said to be receiving education. Nor can the conditions of a school for elementary general education be assimilated to those of a workshop by the mere addition of industrial training, however excellent in its way, as part of the course. They are essentially different. In a workshop time, labour, and material must all be commercially profitable, and the boy is only employed on such work as he is fit for. If the same course were followed in a school, the backward pupils would not be given a chance of improvement. The headmaster cannot put himself in the position of an employer, and dismiss pupils whose work does not pay. The

school time is split up into periods of instruction, which interferes with the finishing of a job in a given time, and tends to make the industrial work a series of routine lessons.

The utmost that can be done at the elementary stage of education—say up to the age of 12—in the way of preparation for industrial callings is to give the children some form of manual training which will quicken their observation and reasoning powers and impart manual dexterity. Drawing and wood-work are generally acknowledged to be the most effective instruments, although the training may take a more specialised form to suit the locality. The pupil will not emerge an expert workman, but he will be equipped for using his brains and hands to good purpose afterwards in the calling of his choice.

The work of the continuation school or trade school or school of industry proper, begins *after*, not *during*, the elementary education stage in all European countries where such experiments are tried. The extent to which general education can be combined with special craft teaching must depend on circumstances. In common with most of the members of the Committee, I have doubts whether in this country a workshop or craft school should attempt to provide any instruction in literary subjects. If such instruction is deemed necessary, it should be quite subsidiary and introduced after working hours,

not sandwiched into the industrial work ; the school should be clearly defined as a workshop under an expert industrial instructor for the demonstration of improved tools and improved methods, not a school for general education with an industrial bias. The success of founding these schools will largely depend on the co-operation of local employers : pupils will not be attracted unless employment awaits them afterwards ; and the training must be adapted to the needs of the local industries. Hence a school should not, I think, be started in any locality where the residents have not asked for it and formed a representative committee to assist.

The recommendations made by the Committee on industrial education, it may be added, are in harmony with the general resolutions on the subject which were agreed to at the Simla Educational Conference of 1901, and subsequently accepted by the Government of India. "The Governor-General in Council," it was said, "attaches great value to the dissociation of technical education from ordinary literary education. The technical or industrial school should be strictly limited to scientific or technical courses. Every endeavour should be made to secure that students, before entering industrial schools, have been properly grounded in the simple forms of education mentioned in the fourth resolution of the Conference on the subject, but it is recognized that it may not always be possi-

ble to secure that the student, when he enters, shall already have received a due amount of ordinary education. In order to meet the cases of such pupils and to secure that they shall not, after leaving an industrial school, enter the world without any literary education whatever, it may be desirable to arrange for their instruction either in night schools or in special classes. But this education should not be conducted in the technical or industrial school itself."

I have endeavoured to outline the view of this question which is generally held by persons who have had practical experience of education. Any differences of opinion which have come to light in the course of the Committee's enquiry and discussion seem to be due to the tendency of outside critics to ignore or at least under-rate the practical difficulties of giving effect to educational ideals. Educational problems are not to be solved offhand, by generalizations on paper: they need patient experimenting. Of what may be called the offhand mode of dealing with such questions, I notice an example in the very interesting work by Mr. A. Latifi on Punjab Industries, which has recently been issued. After condemning the existing industrial schools, the authority says (page 219): "Industrial schools should aim not merely at teaching a handicraft, but also at preparing their pupils mentally, morally and physically for steady and strenuous manual labour for eight hours in the day."

It is absolutely futile to expect a boy who has played with a few tools for a couple of hours, and then scribbled on paper the rest of the day, to take kindly to a workman's life." And, one may add, it is equally futile to expect that a boy who spends eight hours—say from 10 to 6—daily in strenuous manual labour will pick up any general education worth having during the remainder of the day : it would be simpler to apprentice him to a craftsman and trust to a night school for the rest. The capacity of the child in this or any country for prolonged work and study is not that of an adult, and in planning out his day we have to take account of his limitations.

J. C. GODLEY.

The 30th January 1912.